COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Treasure Hunting

There's nothing uncommon about a treasure hunt at a summer camp – but on Wisconsin's Black River the hunters have to use a computer to find three of the clues. Using a terminal aboard a cabin cruiser, Arnold Kwong, Devon McCullogh, and Steve Young tie into the remote time-sharing network at a summer camp on computer science run by Honeywell Information Services. Twenty-one students from schools using the company's computer-aided-instruction program attended two four-day camp sessions this summer. Each session offered 45 hours of DP instruction, as well as traditional camp activities such as swimming and boating.

Scheduled Price Increases Seen Delayed by Nixon Plan

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. President Nixon's new economic game plan to lead the nation to "new prosperity" could be a boon for computer users if the large mainframe manufacturers decide to heed the spirit if not the letter of the President's proclamation.

The boon to users could come in the form of lower than expected prices on leases, purchases, and maintenance charges, and through the use of investment tax credits on equipment purchases.

The major impact of the price freeze, however, will occur if it is extended past the present Nov. 12 deadline, which is a distinct possibility, according to sources here.

The only negative impact of the announcement on the computer community could be to users planning to buy foreign-made units or equipment manufactured by overseas divisions of U.S. firms. This equipment could cost up to 10% more because of the surcharge placed on imports by last week's Presidential message [See industry related story on Page 35].

Manufacturers Assess Effects

Under the new price freeze, manufacturers would be allowed to charge the highest rates "substantially" in effect in the 30 days prior to the August 15 announcement, which will cause some recent price increases by the major computer manufacturers to be cut back to earlier rates.

At press time the three firms – IBM, Honeywell, and Univac – to have raised prices on purchases, leases, and maintenance in the last 30 days were still studying the announcement and "assessing" its effects.

"We intend to comply completely with the President's directive; however it is not clear at this time how it applies and this problem won't be resolved until further guidelines are issued," IBM said in a statement.

The IBM price jumps were announced on July 28 and were effective immediately on purchased systems, but the maintenance and lease rises were not scheduled to go into effect until Nov. 1.

Honeywell said its new rates were effective when announced, at least on new lease, maintenance and purchase contracts. All Univac rises were scheduled to go into effect on Sept. 1.

One spokesman for the Office of Emergency Preparedness, which is administering the guidelines, said the firms would be allowed to charge the rate of "the highest transaction paid in the 30 days prior to the announcement."

Under these guidelines it appears that the IBM lease and maintenance price jumps and all of the Univac raises will have to be rolled back. In addition, the IBM purchase increase – and all of the increases announced by Honeywell – will have to be rescinded unless customers had actually paid bills under the new rates.

The effects of the possible roll backs on IBM users will be slight since they will only cover the period from Nov. 1 to Nov. 12 – unless the freeze is extended. The smart money here is betting the freeze will be extended at least another 90 days, but it is still too early to tell, government sources said.

Communications Users, Too

Data communication users also will get a price break because of the new regulations. Western Electric, which sells equipment to the phone companies in the Bell System, had planned a 5.2% increase on all telephone equipment for Sept. 1.

A Western Electric spokesman told CW that although the firm was attempting to get "clarification of the government order, present indications are that the proposed increase will have to be rescinded."

AT&T itself was applying for rate increases totaling $1.224 billion when the freeze was handed down. The firm said it would not institute any increases.

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New Brush With Power Mess, DP Users Without Backup Lucky

By Edward Bride
Of the CW Staff

WASHINGTON, D.C. The inability of electric utilities to provide consistent, reliable power has "for too long been put aside," according to Sen. Lee Metcalf (D-Mont.), who has called for a national system for exchanging electricity.

While such a system is only one solution to a problem of growing concern to computer users, Metcalf admitted it is at least three to five years away, and might cost up to $2 billion.

Computer users are faced with the more immediate danger of brownouts and blackouts, and are interested in more immediate solutions. They are uncertain about national power resources in general, and about the abilities of their own local utilities in particular.

Just last week, industrial and residential power users encountered a severe blackout in parts of New York City and Albany, plus residential areas of New England.

Only low-frequency relays which severed ties between Manhattan and other areas prevented "another 1965," an official of Consolidated Edison told CW after the situation had been rectified.

But all utilities do not have such safety relays, and even if they did, users in all geographic areas would still face the possibilities of errors or lost files caused by local power failures. Users in both New York and Albany told CW they had experienced lost files in the past, but were not affected by last week's problem.

They said luckily the files were not large ones, and little computer time was lost. The users admitted a major disaster could have occurred, if a different application were in process.

Varying campaigns have been initiated by government and industry to alleviate this situation of special danger to computer users, whose delicate equipment (and necessary air conditioning) cannot endure severe power fluctuations or failures.

Some companies have been pushing uninterruptible power supplies as one answer, but unless computer users have already experienced costly downtime from power failures, they often are not prepared to spend large amounts for this kind of protection.

The same companies have begun introducing cheaper voltage monitors to computer users. These units are designed to detect fluctuations outside manufacturer-certified limitation on computer equipment, so a user may re-run a program from its

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1971 Minicomputer Supplement Follows Page 30

Aug. 23-28 Conference

Worldwide Experts Meet at Ifip

CW European Bureau

LJUBLJANA, Yugoslavia General economic tightness and the remoteness of the site for the 1971 Ifip Congress have made their mark on the triennial meeting of the International Federation for Information Processing.

Potential exhibitors and attendees have both had to assess in advance the value of the congress, and many have decided the relative barrenness of the local market more than counteracts the advantages to be gained from communications with the East.

Like other conferences in the past 18 months, Ifip is getting its fair share of dropouts. Companies such as Memorex, whose chances of moving into Eastern markets in the immediate future are slight, have withdrawn in favor of more localized exhibitions where markets are more sophisticated, such as Sweden.

Others, including Honeywell, have preferred to leave all arrangements to their local subsidiary, a decision which is a bone of contention for the more widespread subsidiaries.

Many attendees remember the last Ifip congress in Edinburgh, in the heart of a major Western European market. Held in 1968 when economies were stronger, and at a time when attendance could be expected to be high (immediately following the Edinburgh festival), the exhibition was judged by some to have failed.

This year, charter companies reported poor bookings and a considerable number of cancellations for tours arranged to cover Ifip. Although Yugoslavia is becoming a popular holiday resort, it is unlikely to have the semi-captive audience that existed after the Edinburgh festival, and the final attendance is likely to be down, following recent trends.

For the European manufacturers, however, Ifip has become even more of a must than it was when

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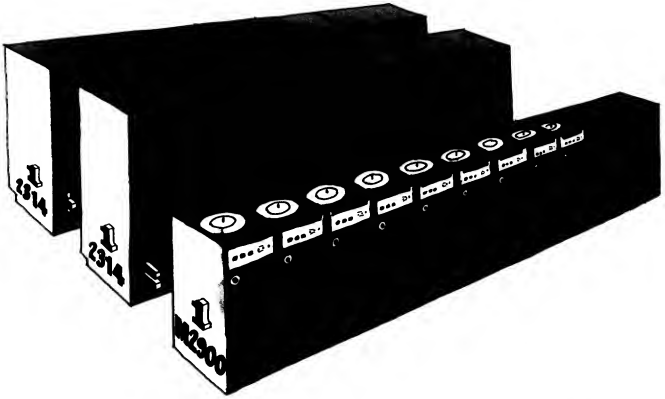
Marshall M2900 Saves 45%



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Cost:	$5,545 per month	$10,128 per month
Storage Capacity:	466.8 Million Bytes	466.8 Million Bytes
Space Requirements:	150 Square Feet	360 Square Feet
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Inadequate Training Cited

'True Input Bottleneck' Slows County Jail Bookings

By Edward J. Bride
Of the CW Staff

SAN DIEGO, Calif. – A short training period and "typical start-up problems of any on-line system" have been blamed for a true input bottleneck: delaying the legal process for citizens arrested but not charged.

San Diego County recently installed 10 video display terminals in the jail, in order to speed up the process of booking or releasing arrestees. Instead, hundreds of persons spent twice as long awaiting justice.

Al Nichols, head of data processing for the county, explained the "average" person arrested but not charged formerly spent four to six hours at the jail, under manual procedures.

Several persons were spending 12 hours before being released when the system first went into operation at the end of July, and at least one was held 19 hours before being released.

Parellel runs were conducted for two months when female inmates were being recorded, but since they comprised only 5% to 10% of the jail population, there was no real test until the entire system went on-line, officials related.

An official at the jail noted the facility was rated for 1,000 inmates, but about 1,400 were incarcerated. Nichols said this was "unrelated" to the computer problem, which pertained primarily to the booking procedure.

'Jail Census' Application

The Jail Census System programmed mostly by county employees is not simply a booking application, Nichols related, but also schedules court appearances and helps generally to manage jail population.

The non-technical operators at the jail appeared to be at the heart of the problem. They input prisoner data on IBM 2260 video display terminals, on-line to a 360/50 at county headquarters about a mile away.

Besides their slowness in becoming acquainted with the new way of recording prisoner data, however, there were the "usual start-up problems," Nichols continued.

"You name it, we've probably had it," he noted, including "garbled and blurred data on the screen," malfunctioning data sets and input "out of proportion" to the capabilities of buffers.

"The system would just wait, looking for an I/O channel," he said.

The county installed its 50, and a 40 for backup, about a year ago, but the jail application is the newest addition. Most of the operators were trained on-the-job, a police lieutenant at the jail related, although there was some formal classroom instruction.

Nichols said he did not know how the input problem could have been avoided, adding, "I can't blame the people for being upset" at the delays.

A system which deals with non-technical operators, and with the general public, "is not an ordinary system," he agreed.

"We thought we had adequate training, but the system did not lend itself completely to paralleling," he added. The county has neither the staff, funds, nor facilities to conduct a complete parallel run, he mentioned.

"It's a problem unique to a jail system," he added, "there was nothing we could have done to avoid it. We thought we were ready."

Users Gain 10% As Firm Recycles Punched Cards

By Ronald A. Frank
Of the CW Staff

PORTSMOUTH, N.H. – If you want to save 10% on punched card costs and strike a blow for ecology in the bargain, Ecology Service Corp. (ESC) can tell you how.

Established four months ago by The Morley Co., a producer of DP supplies, ESC already has more than 35 users who are saving on their punched card budgets by simply repacking used cards into their original cartons and holding them for pickup.

"We recognized our obligation to do something about the waste that is generated as a result of users purchasing our products," William Wilson, vice-president of ESC told CW.

There has been a "great deal of acceptance" from insurance companies, banks, and universities, Wilson said. "But this program is by no means limited to large users. Regardless of the quantity of cards used the savings apply," he said.

As part of the recycling program, ESC sends all returned cards to the Great Bay School for Retarded Children in Newington, N.H., where students are paid to separate them into colored and natural stock piles. The cards then go to paper mills for recycling into general paper products.

Asked if ESC planned to recycle other products, Wilson said, "We are interested in all forms of disposable paper waste generated within a DP facility."

Although it currently serves only New England, Wilson said his firm would be happy to provide assistance in setting up similar card recycling operations in other parts of the country.

"Every 10,000 cards that are recycled saves a tree equivalent to the average four inch diameter pine currently being harvested in Maine," Wilson said.

The firm is at 900 Islington St.

Mini Spots Brain Blood Clots

CW European Bureau

STOCKHOLM – A special-purpose on-line minicomputer is playing an important role in a system under development at the Sodersjukh uset hospital, Stockholm. The aim is to produce a quick, reliable method of identifying strictures, blood clots and tumors in the brain.

The computer is connected to a gamma camera which photographs the passage through the brain of a radioactive isotope. Using these photographs the computer can analyze the blood-flow, picking out any abnormalities that could be caused by a blockage.

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NEW FEATURE: COBOL SYNTAX CHECKER. A syntax checker has recently been added to the Librarian to enable a user to rapidly check the syntax of a COBOL source program as it is being updated. The checker will increase programmer efficiency and accuracy, as well as save COBOL compiling time.

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Backup Contracts Call for More Thought Than Good Handshake

By a CW Staff Writer

CHICAGO – Informal arrangements between users to use each other's hardware in emergencies can lead to major problems, according to an insurance expert.

"You may not be backing yourself up; you may be backing yourself into a corner and end up with complete chaos," said Robert J. Dolan.

But, as one user pointed out, making a formal contractual arrangement for backup presents a more immediate problem. Hardware configurations are changed relatively frequently, and any change in either the user's system or the backup system may force a user to seek new backup systems.

The dilemma posed by the need for emergency backup was brought into sharp focus at the recent Computer Protection/Insurance Workshop jointly sponsored by *Computerworld* and *Business Insurance*. Although arrangements for backup systems were not discussed at length during the formal presentations, the problems involved were brought out during question and answer periods.

Dolan, vice-president of Rollins Burdick Hunter Co., listed a series of questions to be answered by the user.

"First of all," he said, "what would be your relationship with the people who are on a standby basis? Do you have oral or written [agreements]? What would the contract contain? Would it contain hold-harmless agreements to you? This, I think, is something that can't be treated very incidentally.

"You would have to go into detail concerning what the relationship is, the specifics of either the written or oral contract, to determine who is going to hold who liable or harmless.

"It would be very, very nice if I could stand up here and define concretely where the liability would lie," Dolan said, "but the circumstances in each situation must be analyzed and the facts determined from what you develop at that time. There is no cut and dried answer to your question."

Pressed for recommendations, Dolan said a user should know the people with whom he is making an agreement.

"Know them very well. Know how they handle their equipment. How they maintain it. You could have a very, very good agreement and a malfunction in the equipment could cause a large problem," he said.

The other side of the dilemma was brought out at an earlier workshop session by Michael Turbick, director of systems and programming at Playboy Enterprises, Inc.

Asked if he had a contractual arrangement with his backup sites to guarantee to provide a certain amount of time to them, he replied:

"No . . . we didn't think that would work because the backup companies' hardware is changing constantly, ours is changing constantly.

"Whenever we do have a change, we regenerate backup sites. We're going to have to go through the whole thing all over again before the first of the year because right after the first of the year we're getting a 145, and it's a brand new ballgame.

"It's a continuing problem," he said.

News Wrapup

Have Computer, But Where's Site?

CANTON, Ohio – A computer has been sitting in its packing crates for about 15 months now, awaiting city council approval to spend money to prepare the installation site.

The political body has approved payment of the three-year lease to the tune of over $4,000 a month, but over $16,000 for site preparation and $15,000 for systems design remains to be appropriated.

Now, manufacturer NCR wants the city to start paying the lease for the 615. Originally slated for June, 1970, the lease commencement was deferred for six months by NCR, then allowed to "float" until July of this year.

IBM Enters 2nd Counterclaim Against CDC

ST. PAUL, Minn. – IBM has entered a second antitrust counterclaim against Control Data Corp. charging that CDC attempted to monopolize "what Control Data calls" the large-scale computer market.

The action, filed in U.S. District Court here, is in response to the antitrust suit brought by CDC against IBM in 1968, and follows a previous counterclaim filed last spring [CW, April 28].

IBM said it could not release details for the second counterclaim because it contains quotations from Control Data documents that are protected from disclosure by a court order.

Econometric Model Shows Nixon's Plan Good

WASHINGTON, D.C. – President Nixon's new fiscal policy will substantially improve the economy, according to an econometric model prepared by Data Resources, a consulting firm in Lexington, Mass. The results of the model – which assumes among other things that Congress will enact legislation asked for and that the wage-price freeze is followed by a more permanent but limited machinery to prevent continued spiraling costs – were disclosed before the Joint Economic Committee last week by Otto Eckstein.

The model, run on a Burroughs 5500, approximates that two major effects of the President's program will be a dropping of the unemployment rate by 1% or more and a slowing rate of inflation from 4% to 2.6% for next year.

Army Computer Systems Commander Retires

WASHINGTON, D.C. – Army Brig. Gen. Wilson R. Reed, commander of the Computer Systems Command, has retired after 30 years of active service. The first commander of the computer outfit, Gen. Reed received the Distinguished Service Medal on his retirement.

The citation called attention to his "exceptional vision, analytical prowess, and organizational skill," with which he "developed and commanded an organization which planned, directed, and controlled all aspects of multicommand data systems."

Computer Helping City Reap Scofflaw Fines

CINCINNATI, Ohio – Names of scofflaws with two or more unpaid tickets are being compiled by a computer and estimates of the amount owed the city run as high as $375,000. In half an hour, the computer compiles a list that would have taken 10 days to do manually.

DP May Help Clean Up Unserved Warrents

LANCASTER, Pa. – The county sheriff's office has proposed using a computerized program to "clean up" the 1,500 unserved bench warrants and nonsupport attachments issued by the county court. Under the plan, each of the 45 police departments in Lancaster County would receive a printout of persons believed in their area who are wanted by the sheriff's department.

In addition, a list of all persons who have had bench warrants or nonsupport attachments issued against them will be given to Lancaster City Police, the State Police and radio stations.

British DP Salaries Not Especially High

LONDON – The belief that British DP personnel are paid more than managers and staffs in other fields is a myth, according to a salary analysis published in the 1971 edition of the *Computer Users' Year Book*.

The survey indicates only 8% of DP managers earn more than $10,800 per year, while 61% are earning $8,400 or less; 52% of systems analysts earn $4,800 or less. Among the session's analysts in large installations, only 5% receive over $9,600. 93% of programmers earn $4,800 or less.

Has Programmer Hoard Learning Is Eternal?

TALLAHASSEE, Fla. – Mrs. Robert Gunn believes you're never too old to learn, but the programmer of the state department of education's computer apparently didn't share her view. The 84 year old grandmother almost missed her chance to become the oldest woman in Florida to receive a high school equivalency diploma when the education department's computer rejected her application because it wasn't programmed to handle forms filled out by persons her age.

In processing her application, the computer subtracted her date of birth, 1887, from the current year and arrived at an age of minus 16. After a quick manual check of her file proved her eligible, the computer was bypassed and Mrs. Gunn issued her diploma.

Have News for CW?

News may be transmitted to CW by mail, Teletyps, facsimile, or telephone. All news should be transmitted to CW's main editorial office in Newton, Mass.

When a CW staff writer or correspondent, working on the outside, gives another address or telephone number, this address and telephone number should be used only for answering specific inquiries. The handling of other news may be delayed if it is not directed to Newton.

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Ad Hoc Group to Evaluate Feasible Standards for Basic

By Don Leavitt
Of the CW Staff

NEW YORK – An ad hoc study group to consider possible problems in establishment of a standard for the Basic language has been organized within American National Standards Institute's (ANSI) Computer and Information Processing committee.

The group has been asked to determine the technical feasibility and economic justification for establishing a Basic standard. Prof. Thomas E. Kurtz, co-developer of the language, is chairman of the group which will report to the Standards Planning and Requirements Committee (Sparc).

If Kurtz's group finds, as expected, that a standard is justified, it is also to attempt to define a viable nucleus of the language suitable for standardization, an X.3 spokesman said.

In line with X.3's desire to separate languages by their most distinctive characters, the ad hoc group has been told to concentrate on Basic's educational and time-sharing capabilities. The computational facilities of the language are not to be stressed, nor are they to be overlooked, X.3 said.

One of the prime movers towards Basic standardization, with the same stress of its educational purposes, has been Prof. J.A.N. Lee of the University of Massachusetts. In a formal proposal last year, he said standardization should be considered to prevent the language from becoming distorted from its original purpose by enhancements and modifications.

Lee said that he wanted Basic to stay "far enough behind the state of the art so that it does not get too complicated and become ineffective as a teaching medium."

Working with Kurtz on the study group are Stephen Garland, from Dartmouth's Kiewit computer center; Paul Dougher, from IBM; Norman Harvey, GE-Schenectedy; Oscar Hefner, Honeywell; and Karen Kolling, DEC.

The ad hoc group has already met once and will meet again on Sept. 8 at Honeywell in Framingham, Mass. People who are "deeply interested" in the project are welcome to attend this session, a spokesman said.

Otherwise, written comments may be addressed to Kurtz at Dartmouth College, Hanover, N.H., or to Robert Brown, X.3 secretary, at Business Equipment Manufacturers Association (Bema), 1838 L St. N.W., Washington, D.C., 20036.

Fed Now Training Civil Service 'Dead Enders' for ADP Positions

By Alan Drattell
CW Washington Bureau

WASHINGTON, D.C. – The Federal Government has embarked on a vigorous program to train civil service workers presently in lower grade, so-called "dead end" jobs for entry-level positions in automatic data processing.

This phase of the Public Service Careers program enables federal agencies to give some of their employees an opportunity to upgrade themselves by attending courses conducted by the Civil Service Commission's ADP Management Training Center.

The full-time courses prepare these trainees – including the disadvantaged hired by agencies under another program – for positions as card punch operators, computer (programmer) technicians, computer operators, and data processing technical assistants.

Funded in part by the Department of Labor, agencies sending students to the courses must also contribute toward the cost of the training. Overall, CSC has budgeted about $200,000 this year for the program, according to Park F. Anderson Jr., director of the training center.

The trainees are screened by the agencies which send them; and the testing procedures, according to Anderson, differ from agency to agency.

At the training center, the card punch operator course runs four weeks, the computer operator curriculum is eight weeks. The computer (programmer) technician course is 10 weeks and the program for the technical assistant runs 20 weeks.

The first cycle of the card punch operator training class has been completed, and there were no failures, according to Anderson. The graduates returned to their agencies and "hopefully are being launched into a new career path."

The technician training includes both practice programming and lecture sessions. Trainees get a good deal of hands-on experience utilizing a Univac 9400 computer.

Univac outbid several other manufacturers to get its machine installed at the training center site. Discounting the fact that a larger number of government installations contain IBM computers, Anderson said, "When you teach third generation concepts you shouldn't teach hardware. All DOS, for example, is so similar."

The graduate of the technician course, for example, will be able to develop detailed block diagrams, code programs, prepare preliminary test data, test and debug programs, prepare program documentation and maintain production programs.

The technical assistant's course is aimed at providing the trainee with a comprehensive set of basic skills and knowledge in the ADP field. It is expected that he will perform limited systems analysis, programming and operation tasks under guidance.

The graduate computer operator will be able to set up job streams for multiprogramming, operate a third generation computer console, mount computer peripherals, locate and correct error conditions, and assist in program testing and debugging.

Instructor Victor Loubriel, standing second from left, points out controls on Univac 9400 to students in Civil Service Commission's computer operator training class.

Standard Code Asked To Check Out Fruits

NEW YORK – A committee of top executives representing grocery manufacturers, wholesalers, and retailers has concluded that it is feasible to develop a standard system, or Universal Product Code, for identifying grocery items.

A product coding system would be a breakthrough step toward automation of grocery store checkout procedures.

Analyses McKinsey & Co. prepared for the committee indicated the benefits of automated checkstands could outweigh the costs by more than $100 million annually.

The committee has agreed that a 10-digit code is the most practical, given the economic tradeoffs of using shorter and longer codes as well as other types of codes. The committee expects to recommend a standard symbol to represent the code, but only after store tests of alternative symbol markings and checkout devices are completed in 1972.

The committee is now establishing guidelines for companies to follow in developing and testing automated checkout equipment, computer hardware, and display and communications devices.

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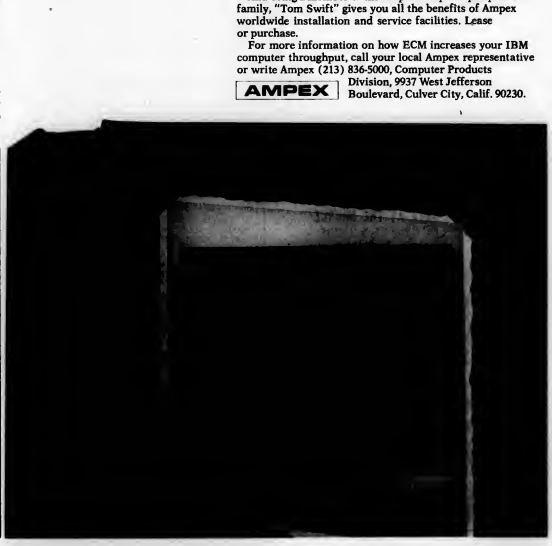

Class B Users Get SEs

WHITE PLAINS, N.Y. – IBM has reinstituted on-site systems engineering support at no charge to users of its Class B software. This class is largely composed of centrally developed applications packages.

Since unbundling, IBM's Class B Program Products have had centralized programming support, including automatic distribution of corrections and enhancements. Field engineering, to aid in the implementation of an IBM package or a user-developed system, has been available, but at hourly rates chargeable to the user.

Now free SE support is again available, but it is not as full, apparently, as it was before unbundling. The IBMers working at the user's site under this plan may help resolve problems in the Program Products, the company said, but they are not to do original system design or programming.

By bringing back even some free on-site support for the centrally developed application packages, IBM has reemphasized the difference between them and the recently established line of Field Developed Programs (FDPs) [CW, Aug. 11].

The FDPs, which have no formal service classification, are available in their original form with nothing but "error correction information" sent to users as follow-up. This information is issued only during the six months following the original release of each package.

Power Puzzles Users, Industry

(Continued from Page 1)

most recent check-point.

Two such units have been introduced by companies at opposite ends of the country. In San Francisco, Pacific Technology has introduced its Model 410 Power Demand Monitor and Limiter which, according to the company, "provides close, reliable monitoring and control of electrical power."

The device can also provide "advance warning of power peaks as well as immediate indication of the effect of corrective action," the company claims.

In Richmond, Va., Power Systems & Controls, Inc., revealed its Model 1200 Voltage Band Monitor for Computer Power. This unit is intended to indicate the "excursions of input voltage, both high and low, beyond the limits of computer manufacturers' tolerances," the company noted. Both high-speed and long duration faults are indicated.

Also "new" in major systems hardware is a motor generator in IBM's 370 series. The device acts as a voltage regulator to protect systems from fluctuations.

The company's 360 and 370 series both "power down" when electric utilities cannot provide power within specified limits (generally 8% to 10% below or above rated line voltage). Other manufacturers' units also offer this feature.

"Powering down" avoids damage to circuitry, but data in memory is often lost. Also lost, IBM noted, would be any portion of the operating system stored in memory, although this could be restored "rather easily" from disk.

Still other companies or groups of users are stressing the idea of on-site power generators where demand is either high or exacting.

The new Internal Revenue Service Center in New York will be served by a "total energy system" designed by Ohio Energy Systems, Inc. (OES), of Columbus, Ohio.

Since one of the "most advanced computer centers in the country" will be housed in the facility, the performance and reliability of the electric supply will be critically important.

W.J. Weaver, president of OES, reminded users that "any significant fluctuation of the power... may cause immense problems in computer operations, including loss or distortion of core data, dropped bits of information, recycling of programs, and even possible damage to the computers themselves."

The General Services Administration and the Internal Revenue project directors conducted a through review of alternatives for power supply, and then decided that an on-site (total energy) utility system could best satisfy the requirements, OES stated.

All these new products and new ideas have not been sufficient to reassure users, however, that any single solution is at hand.

Nixon Plan Delays Expected Price Hikes

(Continued from Page 1)

during the freeze, but would continue the applications before the pertinent regulatory agencies because it "will not serve our goals to simply defer drawn-out hearing procedures during this period."

Equipment Tax Credit

Under the planned "job-development tax credit," users will gain a credit equal to as much as 10% of the cost of new, purchased equipment produced in the U.S. The credit will drop to 5% after one year.

However, there won't be any credit allowed for equipment with a life of four years or less. For equipment with a life of four to six years the credit would be one-third of the amount allowed; and for equipment with a life of six to eight years the rate will be two thirds.

With most computer equipment being depreciated over a five to seven year period, computer users will not be able to get the full benefits of this measure, but can gain some tax relief if it is enacted by the Congress as requested by the President.

The 10% surcharge on imports will not "have much effect" on the computer business, sources at the Department of Commerce said.

The surcharge will affect all "dutiable items" that are imported including computer equipment or systems that are manufactured by overseas divisions of U.S. firms. This 10% increase could be passed on to the user in the form of higher prices, if the manufacturer chose to do so.

Many U.S. firms manufacture parts and components overseas for inclusion in their computer systems, and at least one – Honeywell – manufactures a complete system abroad – the 50 series.

Most manufacturers said they presently have no plans to raise prices because of the surcharge, but they would not rule out the possibility.

International Computers Ltd. said it was "too early to assess the implications of the announcement fully and would not comment on possible price increases.

Firms importing equipment made by Japanese manufacturers indicated they did not know the effects of the surcharge and privately expressed the hope that the Japanese manufacturers would absorb the increase without raising prices.

Metcalf Says Energy Crises Recur, 'National Power Grid' One Solution

WASHINGTON, D.C. – "Power to the people" is more than a slogan of politicians, it is one of the most acute problems of computer users.

The U.S. Department of Commerce and the Office of Emergency Preparedness have published reports saying either utilities cannot meet power demands for the near future; or many utilities can meet these demands, but there does not exist an adequate power-exchange system to aid geographic areas without fully capable electric companies.

A bill recently introduced in both houses of Congress is intended to establish a federally operated national power transmission system. The bill also points up the growing concern over the inability of private utilities to meet the strict power demands of computer users, who cannot endure severe fluctuations or blackouts.

Such exchange systems have been proposed in state legislatures or cabinet meetings several times over the past 20, 30 years, but none of these proposals ever reached Congress, according to Sen. Lee Metcalf (D-Mont.), a sponsor of the bill.

Metcalf's proposed National Power Grid Corp. would establish a system of very high voltage transmission lines and interconnect generating facilities and facilitate power exchange at uniform rates.

The bill, S2324, would transfer to the corporation all electric power generating and transmission facilities of the following agencies: Bureau of Reclamation; Army Corps of Engineers; Southwestern Power Administration; Southeastern Power Administration; Bonneville Power Administration; and the Alaska Power Administration.

Other agencies, like the TVA, would act as regional coordinators for exchange systems, some of which already exist.

Worldwide DPers to Ifip Congress

(Continued from Page 1)

Ljubljana was first selected as the site. As trading restrictions are lifted the whole Eastern bloc becomes more open for competition, which destroys the semi-protection previously enjoyed by these European manufacturers, but makes an increased sales volume possible.

ICL, largest of this group of companies, and typical of them, is here primarily for the benefit of East European visitors. ICL is able to offer a wide range of applications packages, and concentration is seen on management information systems for business purposes, medical applications and communications.

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Program Patents to High Court?

By a CW Staff Writer

WASHINGTON, D.C. – The patentability of computer software may come under review by the Supreme Court.

The Solicitor General of the United States, who represents the government before the court, has obtained an extension during which he could prepare and present an appeal on the most recent software patent.

The latest decision by the Court of Customs and Patent Appeals (CCPA) was handed down May 8, and recommended approval of the Benson-Tabbot program for converting BCD date to true binary, a patent officiai said.

The term for appeal expired around Aug. 3, 90 days after the decision, but the Supreme Court extended the period another 60 days.

Uncertainty about appeals of the validity of software patents prompted the Information Industry Association to seek a Supreme Court ruling. An IIA resolution was sent to Rep. Jack Brooks, member of the Committee on Government Operations, and Brooks supported the resolution in a letter to the Department of Commerce, which controls the Patent Office.

IIA said the reason for requesting a Supreme Court review of software patentability was that "uncertainty of the final outcome of the decisions, if processed through a long chain of infringement suits, would keep the field in a state of uncertainty for years."

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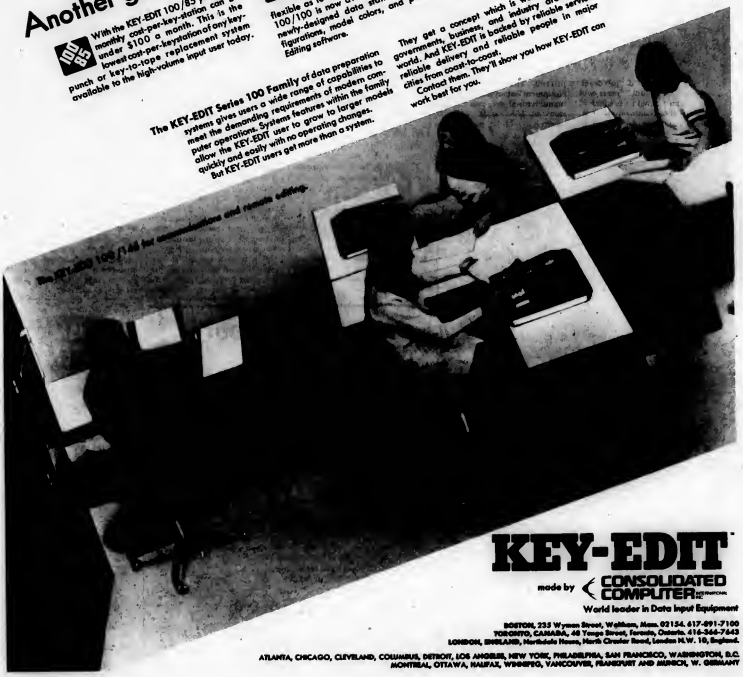

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New Courses Help 360 Users

NEW YORK – Software Sciences Corp., an educational firm specializing in IBM 360 instruction, has added four new courses to help users get "more efficient utilization" from their installed equipment.

The new additions which bring the Software Sciences curriculum up to 53 courses for 360 users include: ANS Cobol features, advanced Cobol programming techniques, advanced debugging and testing, and mass storage utilization for programmers.

The courses range from $175 to $225 and last from three to five days, according to a spokesman.

Although the firm currently offers only 360 training, a spokesman said Software Sciences will soon begin to include 370 courses. The first of these, scheduled for this fall is a course on 370/155 OS facilities techniques. A 360 education catalog is available from the company at 880 Third Ave., 10022.

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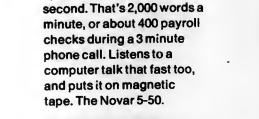

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OS Users Get Core Dump Training Aid

LOS ANGELES – Edutronics Systems International Inc. has added an MFT Core Dump course for 360 OS users to its list of in-house DP education offerings.

The course is primarily intended for applications and technical programmers who have either MFT or PCP experience.

But systems programmers may also benefit by saving time in

Education

core dump analysis, Edutronics said.

The course trains personnel to read and analyze memory images dumped by the CPU while operating under the MFT control program. Prerequisites include a basic knowledge of 360 OS fundamentals. Some working experience with a third generation language, such as Cobol, Fortran or PL/1 is desirable, the firm said.

The core dump course includes nine half-hour videotapes which the user must purchase and costs $891, a spokesman said. Designed for in-house education at user's installations, the course includes supplementary material such as manuals, workshop exercises, and quizzes.

Edutronics also has a seven-film course on systems analysis and design. The course covers a system's life cycle from inception to the time when goals are implemented. It is available under the firm's 10-film yearly lease plan which costs $450.

Other films on fite processing, and programming in Cobol, Fortran, and Basic are available for in-house training by users. Information about Edutronics DP courses is available from 3345 Wilshire Blvd., 90010.

Keyboard Simulator Can Develop Operator Source Document Skills

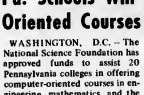
ARLINGTON, Va. – Kee Inc. has introduced the Model 40/72 keyboard simulator which can train operators to become familiar with key entry devices used at DP installations.

In addition to developing basic skills required with key entry terminals, the simulator can be programmed to train operators in the processing of specialized source documents.

The unit, called the Edu-Kee consists of an individual console with visual display in addition to various keyboard configurations and operator scoring counters to monitor training progress.

Special keyboards can simulate teletypewriters, key-to-tape devices and keyboard type terminals. In addition to physical overlays for visual familiarization by the operator, software is available to simulate the operation of specific key entry devices, a spokesman said.

The 40/72 is a solid state unit and costs $2,795 for immediate delivery. It is available through the Gregg division of McGraw-Hill but maintenance is provided by Kee at 1911 Jefferson Davis Highway, 22202.



Keyboard Simulator

Gavilan College Will Tie Into Bay DP Net

HOLLISTER, Calif – Gavilan College here has received a $24,300 grant from the National Science Foundation to tie in to the Stanford Bay Area Education Computer Network.

Effective July 1, the two-year grant will enable the college to communicate with Stanford's IBM 360/67 via remote terminals.

Gavilan has a Hewlett-Packard 2007, used mostly by the mathematics, physics and science divisions.

Pa. Schools Will Upgrade DP Oriented Courses With Prise

WASHINGTON, D.C. – The National Science Foundation has approved funds to assist 20 Pennsylvania colleges in offering computer-oriented courses in engineering, mathematics, and the physical, biological, and social sciences.

The Pennsylvania Regional Instruction System for Education (Prise) will use DP centers at three universities in the state to provide technical services, information, and processing assistance to participating institutions.

The main purpose of Prise according to a spokesman at Penn State, one of the regional "resource institutions," is to build up in-house DP capabilities at participating colleges to support existing curriculums. In addition each school may develop degree programs in computational science.

Under the Prise system, Central, Western, and Lehigh Valley regional DP networks will be established to train DP faculty personnel at participating public and private institutions. Most of the Prise schools already have "some DP capability," the spokesman said.

In addition to NSF grants, Prise is being funded by participating schools and the state government which is coordinating the program through its department of education.

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The CDS-214 is a two-high unit that stores 466 megabits in half the floor space. It has a unique electromagnetic head-positioning system — without mechanical parts, detents, or gears — that gives faster access time (65 msec compared to a competitor's 80 msec). All common logic is packaged on a common board, so the end result is one-third as many boards — and MTTR is reduced to a 1-hour maximum (compared to a competitor's 1.5 hours). And, an off-line checkout exerciser quickly isolates problems without tying up the controller.

Other features also make the CDS-214 "more than just equivalent to": a cylinder difference calculator that simplifies OEM controller design, a variety of index and sector generation electronics for variable or fixed formatting, and interface options for virtually any industry standard logic. So that your system can be more than "just equivalent to," we'll be happy to send you full details.

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Editorial

The Professional's Viewpoint

With this issue, CW is printing the first edition of a new feature, a page devoted to the opinions of data processing professionals.

Called "The Professional's Viewpoint," the feature represents a cooperative venture by CW and the Society of Certified Data Processors. Material for the page, both from society members and others, will be selected by the society. CW has reserved the right to refuse any material which it feels would be of interest only to society members.

The purpose of the feature is to allow DP professionals to initiate discussions of matters of concern to the computer community. It is not designed to replace "Letters to the Editor" but to offer an additional opportunity for the exchange of viewpoints.

'I'd Rather Switch Than Fight'

Letters to the Editor

Does Price Rise Foreshadow Short System Life of 370?

Does IBM's new price increase foreshadow the short system life of the IBM 370 computer systems? Even before delivery on the majority of orders outstanding, IBM is raising its rates, which has never been done before in the history of IBM.

IBM has figured its financial return over a shorter period on these systems. It appears that the IBM rental customers are going to be whiplashed further in the future. It is noteworthy to see that IBM has yet to deliver any significant improvement in software for these systems to date.

When these program products are announced, IBM will further whiplash the customer with greater revenue return to IBM than for any IBM 360 system replaced.

It appears that IBM is the largest, uncontrolled public utility in the rental and leasing field, can do what it wants, and when it wants. With this current announcement, it has not even protected the purchase letters from its customers, based on prior orders placed for IBM 370s.

It appears that IBM's monopolistic control of the computer industry is going unchallenged. The greatest fear today is the consent decree between IBM and the Justice Department which will be significant and perpetuate the IBM monopolistic control, comparable to the 1956 consent decree.

George S. McLaughlin Jr.
George S. McLaughlin Associates, Inc.
Summit, N.J.

Wanted: More Efficient DP Use, Not Architecture

Alan Taylor, with his expertise throughout the data processing field, has been more than helpful in giving your readers a more professional approach to true data processing problems; i.e., systems design problems, programming efficiency, data file manipulation, etc.

Still, I have noticed lately, Taylor has been overly concerned with machine architecture questions. Granted that it is sometimes important for the user to be familiar with instruction timings, internal cycles, and other hierarchical procedures, but I don't think that 99% of your readers have either the need for nor the capabilities to fully digest information of this sort without becoming involved very deeply in the area of machine engineering.

In a field where major breakthroughs are to be achieved through more efficient use of the machines we have, there is no need – from the user's point of view – to be battling about with terms like 4-cycle instructions, and 60 add-bonds.

The programmers don't need it, the systems analyst doesn't need it, and the DP manager ends up with personnel reciting this new language as excuses for poor performance.

By all means, let us have a degree of knowledge about internal timings and languages, but let us also remember that first we have to learn how to judge machine performance in general, so that we don't end up with a monster six times bigger than we'll ever need.

Let us try to use the available machine power we have to create more economically feasible applications. And then maybe, by the fifth generation of machines, we'll be able to efficiently use the third.

Carlos J. Lavastida
DP Manager
New York, N.Y.

Good Law Clerk Better, Cheaper Than Computer

Common sense tells me your editorial of July 28 [on Supreme Court simulation] was written as high satire. However, some of our staff took the matter seriously as did the *Wall Street Journal* in commenting on Prof. Spaeth's work some weeks ago.

Why waste system development and programming time in order to develop a system that is less accurate and more expensive than any good law clerk in his first year of practice?

Personally I am convinced any competent constitutional attorney can forecast the outcome of 97+% of Supreme Court cases with relative ease in less time and with less cost than Prof. Spaeth's system, not including the time or cost incurred in developing, updating and maintaining his system.

It is my firmest belief that computers have a vital role in both scientific and administrative applications, but the industry is only hurting itself in encouraging ridiculous applications of computer technology.

Daniel D. Frawley
Research & Training Administrator
State of Wisconsin
Legislative Audit Bureau
Madison, Wis.

Basic Grasp Price $300/mo

Thank you for announcing the latest Grasp enhancement, the FO Partition option. However, the basic price of Grasp remains at $300 per month, not $400 as mentioned in "Random Notes," July 21.

Perhaps your readers may also be interested in knowing that Grasp is now spooling the IBM 360/20 computer as well as other remote and local devices for the IBM System 360 and 370 DOS user.

Larry Rebich
Branch Manager
Software Design, Inc.
Oak Brook, Ill.

DP vs. People Reviewed

"...nobody with a computer will beat an organization without one," is a statement that's been attributed to Jack H. Vollbrecht, president of Aerojet-General [CW, July 21]. He was also reported as having claimed that "people do a better job of running a company than computers."

Vollbrecht probably had ample provocation for throwing out Aerojet-General's computers. Especially if they had taken to running his company – clearly, a case of insubordination!

But, the sweeping generalizations he has made about computers and people create the strong impression that he knows little about the capacities of the former and probably less of the latter.

If Vollbrecht has people who are "in a position to make useful decisions" whose motivation and intelligence can be "sapped" by computers, I suggest he has made the improper choice of throwing out the computers.

Eric D. Domingo
Computer Professional
Bountiful, Utah

Harvard Directed Program

I am writing [about] your "News Wrap-up" story on the Harvard Program on Technology and Society [CW, Aug. 4].

As we understand it, the program has not been "killed," but redirected – relating it more to the teaching function of the university.

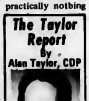
IBM did not lose interest in the program, nor did IBM tell Harvard to use the remaining funds for projects in the general field of technology and society. From the beginning, the direction of the program has been entirely up to Harvard.

James B. O'Connell
Director of Information
IBM
Armonk, N.Y.

The project was killed. It was the money that was redirected. Ed.

The Problem of Stage II: Are Dollar Charges Valid?

The Taylor Report
By Alan Taylor, CDP



Last week I mentioned some of the background over the years of automatic optimizers. In particular I brought out the fact that from the Soap optimizer (for absolute machine code) in 1956 until the recent announcement of Stage II practically nothing had been accomplished in this field. Instead, the problems of writing and keeping running (as opposed to executing) programs had had such a priority that optimization had become a sour taste in everyone's mouth.

Technical Revolution

Stage II, which can optimize source language Cobol programs, allows the user to have his cake and eat it too. As everything stays in source language – that is, in Cobol – the programming investment can be minimized, and protected.

Yet as the source language itself is optimized, better running times, and core utilization can still be obtained.

Stage II is, then, quite a revolution in its technical way.

Other Problems

And yet, I think this may well be only a minor part of its importance. Because Stage II, quite accidentally, happens to make evident a few economic facts which computer installations have been living over the years – and which many would like to continue ignoring.

It puts installations straight on the horns of the dilemma of whether to scrap their current computer time-based charging methods (which conscientious professionals they should do) or to try to continue along, asking their users to give them "blank-check" authorizations every time a program is executed, which effectively subsidizes inefficient operations.

Marketing Forces Issue

Curiously enough, it is not Stage II itself that is posing this problem but rather the marketing method, Optimail, which Optimization Sciences, Inc., Silver Spring, Md., is using.

Optimail allows an installation to mail in a Cobol program and receive an optimized version.

The cost runs about $100/program.

Seems innocuous, doesn't it?

Charging Problem

But look what happens at a Cobol shop – say a 360/30 with 65K, four tapes and three disks.

Let's suppose it is charging a reasonable figure, say $40 per hour. And let's think what happens when those monthly usage rates go out – and with them the bills to other departments of the firm.

One might read, for instance: "Sales Analysis, by Division & Product . . . .8 hours" and the accompanying bill would read $320. Not a very high figure. *But one which although only for a month is substantially higher than the cost of optimizing the central program of the analysis.*

And therein lies the rub.

From the short term point of view, of course, the computer department quite reasonably does not want to reduce its billings out. So it has no interest in cutting time, indeed it has a very distinct preference in keeping the hourly use high. After all, the sales department hasn't formally complained, has it?

Professional Responsibility

And yet, from a professional point of view, the computer people make their salaries by claiming to use their special knowledge of the situation to the user's advantage, particularly as the user does not know enough about the situation to protect himself.

After all, the sales department people aren't computer experts, are they?

Of course this problem of using time-based charging methods (which place a premium on inefficiency and tend to drive computer hardware demands up and up) has been with us a long time now.

But until recently – indeed until Stage II – there were easy ways of avoiding the problem. The investment could be said to be too great – or there were other needs for skilled personnel – or just "let's wait until next year," or "until we get our bigger machine in." All these were available.

And, besides, no one in the shop was interested.

Remember the time when I reported on three reviews of a Cobol optimization course that showed that neither the programmer (I don't handle machine schedules), the operations manager (I'm in no position to suggest program changes) or the System Analysis, by Division & Product . . . .8 hours" and the accompanying bill would read $320. Not a very high figure. *But one which although only for a month is substantially higher than the cost of optimizing the central program of the analysis.*

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Remember the time when I reported on three reviews of a Cobol optimization course that showed that neither the programmer (I don't handle machine schedules), the operations manager (I'm in no position to suggest program changes) or the System Analysis (who sat on the fence and suggested a review) were going to take action, although they all admitted that the Cobol programs running were inefficient? [CW, Jan. 20].

Excuses Vanished

But now those excuses are no longer valid. It doesn't take skilled manpower to wrap up a parcel, and put it in the mail. And it doesn't make any sense not to be prepared to invest around $100 to reduce the time (and user cost) on a program that runs up user charges of more than that a month.

So . . . the excuses are no longer valid.

And Cobol users, at any rate, should now be able to get reduced charges.

Of course, as the computer installation will still have to get enough money to carry on, it will have to look at just where its money is going, just who benefits and to what extent etc. And it will have to revamp its accounting system, bringing computers out of the carriage-trade era when blanket authorizations were normal, into the cold, hard light of the 1970s.

It will be uncomfortable – true. But it will mark real progress in our professional development.

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Taylor Thoughts

A few weeks ago my report cited the experience of Stephen Metelits, who received his Bank Americard bill from an anonymous bank at One First National Plaza, Chicago, with a postmark so late that he could not possibly pay the item in time to avoid a service charge [CW, June 30].

It was a delightful case that the BankAmericard people have continued rather magnificently in a form letter signed by an illegible John F. someone and identified only as "Manager, Customer Service Department" but without any identification of the actual organization involved, in it, they conveyed their apologies for sending the bill to Metelits late.

They blamed "a changeover in our computer system."

They then went on to ask that if a service charge was imposed on the June statement to let them know and they would credit it. Why they could not find out themselves is beyond me.

Needless to say, the billing date in June also, which is supposed to be the preparation date, according to their propaganda, was again nearly three weeks before the post marked date.

And then they claim that computer people can avoid problems with computers, ha!

— — —

Another annoyed data processor is John F. Callahan, who is fed up with the Diners Club. His current problem started when they started dunning him three months ago after they acknowledged his cancellation, and admitted they owed him $8.63.

The problem seems to be an unsupported debit adjustment for $17.26, plus a 50 cent late fee.

The original problem was to get an error from January, 1970 corrected. He found only one person, in months of trying before cancelling, who had any "intelligence and/or sensitivity with customer relations."

Callahan's response to all this was rather good. He billed the Diners Club $144.15 for time involved in trying to get its accounts straight, and copied his letter to the business editors of six papers, various credit card people, Ralph Nader, and others.

I wonder if he had any success.

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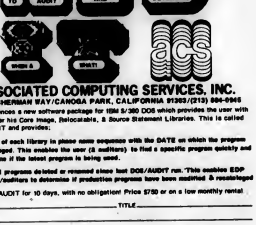

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The Professional's Viewpoint

Society, CW Cosponsor Forum for Professionals

"The Professional's Viewpoint" page, a new feature cosponsored by the Society of Certified Data Processors and the editors of *Computerworld* will provide a special forum for the discussion of matters of professional concern in the data processing community. It will present the views of DP professionals who are not members of the society as well as those of society members.

Professionals may contribute articles, or respond to articles, by writing to: The Professional Viewpoint, Society of Certified Data Processors, 633 Central St., Framingham, Mass. 01701.

IRS Ruling 71-20 Imposes An Unconscionable Burden

IRS Revenue Ruling 71-20 states, "... that punched cards, magnetic tapes, disks, and other machine sensible data media used for recording, consolidating, and summarizing accounting transactions and records within a taxpayer's automatic data processing system are records within the meaning of section 6001 of the Code and section 1.6001-1 of the regulations and are required to be retained so long as the contents may become material in the administration of any internal revenue law."

This ruling imposes an unconscionable burden on the taxpayer and *will not* serve the best interests of either the IRS or the taxpayers.

I do not believe that information stored on machine-sensible data media should be interpreted as "records" or "permanent books of account or records" as used in section 6001 of the code or section 1.6001-1 of the regulations and therefore have to be retained indefinitely. The taxpayer does not rely or utilize the information as it is physically stored in machine-sensible form, but rather uses the outputs, primarily in hardcopy form, for his permanent books and records along with the related source documents.

The retention of the machine-sensible data media for use at some unknown time (perhaps 10 years) in the future to recreate or further analyze information also stored on the hardcopy permanent records of a company presents many costly problems. Among them are the following:

- Magnetic tapes and/or disks used for this purpose can not be reused during the retention period; i.e., a large number of additional magnetic tapes and/or disks will have to be acquired at high cost to the taxpayer.
- Storage of this data will require an environmentally controlled area to avoid data loss and machine malfunctions. Such areas do not now exist in most installations.
- The longer it takes the IRS to audit the returns of a given year, the higher the cost of retention will be to the taxpayer (up to the statute of limitations).
- Retention of information on machine-sensible data media will not stand in lieu of the retention of the same information in hardcopy form.
- Retention of information on machine-sensible media will also require the retention of some of the computer programs, and technical know-how used to process and print that information originally and add compatibility requirements to emulate the original hardware and software systems.
- Information on machine-sensible media could rarely be used without considerable assistance by the taxpayers' personnel (if his personnel with that knowledge still work there).
- The taxpayers' personnel would probably have to assist in writing any special audit tests.

I consider the ability to comply with some IRS reporting requirements through the submission of information in machine-sensible form to be desirable. However, I do not interpret the impact of Revenue Ruling 71-20 to be confined to the cases where retention is desirable and practicable. – Wm. L. Thomson, CDP, Sterling Heights, Mich.

Why Are DP People Afraid To Ask for More Detail?

Why are we afraid to say "I don't understand that exactly." "Can you go over it again in more detail?," "Can I see an expert in that area," etc.?

I believe that many of the problems in computers arise in the failure of computer people to ask these questions, to check that communication has taken place properly. The very same people who will freely admit that they can't hear over a telephone line (due to a bad connection) but will sit and "head-fake" their way through a system description – even a bad one.

They will miss key point after key point because they're being snowed (or worse don't care) by the jargon fest.

Result: they go off and do their own thing, *nominal* inextensive testing is done on their thing, and the users debug the programs with thousands of letters a week. People have learned to hate computers, and do not listen when you tell them that it is the people – not the computers.

Why are we so afraid to ask questions that we tolerate such as poor result? – Robert M. Davis, Washington, D.C.

DP Professional Defined, But Not Yet by Law

There are a number of definitions of the word profession in Websters. The definition that I believe covers the EDP professional reads: "A calling requiring specialized knowledge and often long and intensive academic preparation."

Is this not where we who wish to be professionals should start?

What is it we want to be professionals in?

Professional doctors, lawyers, accountants, etc. know what they are professionals in, they know what training is required before they can be called professionals. They are sworn to codes of ethics which are the basis of their professions and the initials after their names are backed up by legislation which they themselves fought long and hard to get into law. – E.A. Gaudry, CDP, New York.

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Users May Benefit From Groups' Fight for Members

By Edward J. Bride
Of the CW Staff

NEW YORK – The growing conflict among three computer users' groups may never be resolved, but it illustrates the wide choice users have in selecting an organization to further their own technical, professional, or managerial ends.

All three are oriented towards users of small IBM computers, but the similarity ends there.

The oldest and biggest is Common, an IBM-recognized group of about 1,000 users of up to a "small" 360/40.

The newest is Nasu, the National Association of System/3 Users, formed this year, growing rapidly on the West Coast (and in several chapters) and boasting independence from IBM influence.

In the middle is Guidance International, formed a little over three years ago here. Also oriented to the small-computer users, the group attained IBM "affiliation" this year and has started an expansion program to form regional chapters.

The conflict appeared to be nothing but friendly rivalry until the quarterly meeting of Common earlier this month, when the veteran group proposed a confederation of all the chapters, local and special-interest groups into one mass.

Guidance said "no," essentially because officials feel Common's quarterly (next year thrice-annually) meetings are too infrequent to benefit members. Guidance meets monthly, has guest speakers usually from the user community, and discusses systems and management problems. Attendance normally runs from 20-50.

Common's meetings, while less often, draw around 400 attendees, with about one-third to one-half coming from the "establishment," namely IBM. While several of these are systems designers and technicians, there is little doubt many are also salesmen or branch managers.

Either way, Common officials like the direct confrontation with the manufacturer, and they appeared pleased that problems can be handled in "real time" at meetings.

As a tradeoff for this capability, Common does not take any advertising in its publication *Cext*, a monthly compilation of user letters regarding problems or – more important – solutions to common difficulties.

Nor does the group have "sales meetings" to evaluate software from a variety of vendors, although they do not preclude other manufacturers *per se* from giving technical presentations during meetings.

Nasu didn't "vote" on the confederation proposal. In fact, it didn't even attend the confersition session.

Nasu President Irwin Cohan said he would rather have the freedom of completely open meetings, like Guidance but unlike Common which prohibits the press from viewing the "confrontations."

Nasu would also rather have the ability to advertise software, supplies, or other S/3 devices in its Newsletter. With this financial boost, it does not have to rely on a manufacturer to foot the bill for printing and mailing, as reportedly occurs with some "affiliated" groups.

The Nasu president is also suspicious about the publications of "recognized" groups. He considers the recognized groups "manufacturers' groups . . . Nasu is the only true user's group in existence today . . . our Newsletter is not edited by IBM or any other vendor."

While Common's *Cext* is a direct, photo-

Societies/User Groups

graphic reprint of users' letters, Cohan feels IBM can prevent some criticism from appearing in that publication.

Both Guidance and Common emphatically denied any IBM censorship, one of the few points on which they agreed.

Common added, "We generate our own meetings, except we look more carefully at presentations on proprietary products. We do not want users to make a sales pitch at our meetings."

Guidance also claimed autonomy in planning meetings. "The only thing we don't allow is a competing CPU sales pitch," an official told CW.

While Common's strongest argument for affiliation with IBM is the confrontations, the direct answers, the meetings with technicians normally "protected" from customers, Guidance likes the educational advantages.

"A lot of our members come from one- or two-man shops," an official noted. The ability to actually design a course in systems, programming, or management principles, then offer it to members at a cheaper cost than IBM, is especially meaningful to these members, he added.

In perspective, all the groups seem to have their advantages. For Guidance, the chief positive point appears to be educational and managerial betterment, with slightly less emphasis on the technical side.

For Common, it appears to be more technical, although sub-groups are established for administration, applications, and installation management. The degree of IBM participation is also greatest here, which can be seen as positive or negative, depending on the viewpoint of the user, or on his needs.

In Nasu, the prime advantage appears to be complete freedom to "shop around," which can be more important to a first-time (the typical S/3) user who has not experienced sales meetings, non-standard comparisons, or inadequate systems or support in the past.

Nasu members, then, do not have the "IBM orientation," as Cohan put it.

Other users have suggested that, because of the disparity of purpose and orientation, the confederation could never occur, but users might best serve their own purpose if they joined two or all three groups, conflict and all.

SMIS Meets in Denver

DENVER, Colo. – "Identifying Universal Principles in MIS Design" will be the theme of this year's conference of the Society for Management Information Systems, to be held here Sept. 9-10.

Past meetings have provided separate sessions for various aspects of MIS, the group noted, but this year's conference will provide for integration of the perspectives of the MIS designer, the management scientist, and the executive user.

Information from SMIS at One First National Plaza, Chicago, Ill., 60670.

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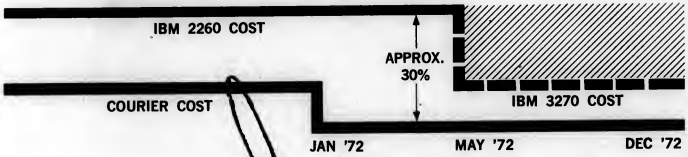

If you're thinking of waiting for IBM's recently announced 3270, it may be well to pause and consider what the *real* cost may be.

The cost in time is obvious. Deliveries of the 3270 won't start until the middle of next year. Courier is delivering Executerm 60 and 260 Series CRT Terminals *now*.

The dollar cost is even more obvious. Courier is priced below today's 2260/65, and will be at least 10% below the 3270 when it is available. You save with Courier now, and while you are waiting for the 3270. It adds up.

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Random Notes

Mark IV Users Gain Speed Through Special Feature

CANOGA PARK, Calif. – A resource optimization special feature can be used to improve either core utilization or processing speed of the Mark IV File Management system from Informetics.

Processing speeds have been increased from two to 10 times through the use of the feature, the developers claim, adding that the average improvement will be by a factor of four.

The new feature is available at no cost to the user, Informetics noted.

Pollution Fought With 'Cost' Analysis on Canadian T/S Net

MONTREAL, Quebec – Users of the Computer Sciences Canada network can access the Cost Oriented Systems Technique (Cost) software to find the best way to fight pollution as quickly as possible.

Cost allows the user to analyze the various methods of control and to define, probably within a week, according to CSC estimates, the cheapest and most effective way to either clean up the pollution that has already occurred, or to stop pollution before it starts. CSC is at the Place du Canada, here.

Project Costs Closely Watched By Program on GE T/S Network

BETHESDA, Md. – An information retrieval program that provides time-critical expenses-to-budget analysis and reports of items that make up complex projects, all of which may be progressing simultaneously, is now available to users of General Electric's time-sharing network service.

The Financial Analysis of Project Performence (Fapp) program is designed to complement a firm's existing manual or batch data processing accounting method, which may only provide current-period cost information.

PMI Adds Shareholder System

NEW YORK – IBM 360 users with 65K of available core can control shareholder record keeping with the Corporate Shareholder System from Programming Methods Inc. (PMI).

Reports generated include listings of shareholder activity, shareholder options and dividends, proxie tabulations, and an accumulative journal. Status reports on selected accounts can also be produced through the $25,000 system. PMI is at 51 Madison Ave.

Computility Has Stat Service

BOSTON, Mass. – Statpak, an interactive statistical system that can provide 21 different types of analysis, is available to users of the Computility time-sharing service.

The system includes probit, factor and discriminant analysis as well as analysis of variance, Computility said.

Computility is at One Center Plaza, 02108.

Com-Share Service Plans Feed

ANN ARBOR, Mich. – Producers of animal feedstuffs can optimize formulation costs through nutrition analysis, production scheduling and inventory control techniques built into the Nutrition Management Service, available on the Com-Share time-sharing network.

Helps Future Planning

Scheduler Optimizes CPU Time Usage

By Don Leavitt
Of the CW Staff

CLEVELAND, Ohio – IBM 360 users operating under OS/MVT may be able to save hours of computer time each day by using the Computer Scheduling System (CSS) from C.P. and Associates.

Although designed primarily to balance job mixes in terms of core and peripheral requirements, CSS also considers running times and time dependent factors.

Because of the simplicity of the CSS input, the system also serves as a simulator or modeling tool to determine future hardware requirements and the impact on the overall scheduling of programs still in development.

The system creates and maintains a scheduling data master file that includes name, running time, core and peripheral requirements, processing frequency code and similar basic information on each job to be scheduled.

From that file, CSS creates scheduling cards for all jobs to be run on a given day. By providing card input for the actual scheduling run, CSS gives the user an opportunity to make manual corrections in the proposed work load.

The scheduling run matches the work load against system restraints defined in a system resource lead card. This outlines the desired start time of the schedule, the amount of core available to the application programs, and the number and types of peripherals. Since these factors are defined at execution time, the schedule can take hardware problems into account.

The system schedules jobs at 10-minute increments for periods as long as 36 hours. Jobs that must start at a given time are considered immediately after jobs already in progress at the start of the schedule. Other jobs are scheduled in accordance with user-defined priority codes.

The scheduler reports any jobs that couldn't be scheduled and the reasons they couldn't be handled. This might be caused by lack of available core or peripherals, or a conflict with other jobs.

The simulation or modeling capabilities are built around the user's ability to modify the card input to the scheduler run, or the system resource lead card.

The CSS programs are written in Cobol and require 120K of core. The package costs $10,000 including normal installation assistance. C.P. and Associates is at 32915 Aurora Road, 44139.

Independent Fortran IV Compiler Called 10 Times as Fast as IBM's

WILLIAMSVILLE, N.Y. – Users of a DOS-oriented Fortran IV compiler from Nanodata Corp. are said to be able to process programs up to 10 times faster than with an IBM-provided Fortran compiler. The Nanodata compiler can handle 4,000 source statements a minute, according to the company.

The compiler is intended as a testing tool for university centers with heavy student job loads, and high production centers where quick turnaround is desired.

The system provides high-speed processing through the use of a spooler that moves the user's source code from cards to a faster input medium. It also avoids the punching of object decks: it is strictly "load and go."

The Nanodata compiler does generate a program listing, however, including full text diagnostic messages so basic programming errors can be identified quickly.

Test runs under the Nanodata system either go to completion, abort due to a program problem, or run until they reach user-defined time or printer output limits. With the latter controls, programs cannot continue in endless loops or in a stalled state, a Nanodata spokesman explained.

Nanodata's package requires 48K of core, a card reader and printer. It makes use of tape and disk drives, if available.

Nanodata Corp. is at 2457 Wehrle Drive, 14221.

'IQ' Builds Retrieval Programs

QUINCY, Mass. – Users with 128K bytes of available core under DOS or OS/360, or under RCA's TDOS for the Spectra 70, can search, sort, calculate and print data from multiple files by using the Information Quick (IQ) retrieval package available from Computeria Inc.

Developed by The Management Group Inc., Waltham, Mass., IQ can handle more than 100 requests per pass on an RJE or batch basis. Each request is tested for validity and excluded from the retrieval list if it contains a basic error. A list of errors is printed and the user then has the option of aborting the entire run.

The accepted requests are translated into high level Cobol source code on cards, to be used as input for a normal compiler run. This keeps the IQ logic simple, and allows the user to insert his own coding for situations that cannot be defined through IQ, the developer said.

Retrievals can be based on item name or number, name synonyms and item codes or code meanings. Program logic can be controlled on actual field contents or on results of calculations performed on the contents. Statements available include CALL, PERFORM, COMPUTE and GO TO, according to a spokesman.

The package sells for $15,000 but three- and five-year lease terms are available, according to Computeria located at 148 Old Colony Ave., 02170.

Routines Let RPG, Cobol Users Access DOS, OS Facilities

NEW YORK – Cobol and RPG programmers can use OS and DOS/360 facilities not normally accessible by them, through two packages of "programming aids" from Datasonics Inc. These Assembler Language routines can be used to solve coding problems that would be awkward or impossible to handle in the higher level languages, the company said.

The Cobol Aids package contains subroutines that permit date comparison and editing, and the accessing of date and time information. Other routines provide a module timer for testing, and allow the user to take "snapshot" memory dumps while a test is in progress. Abnormal terminations are controlled by another subroutine.

OS Return Code Passed

Cobol users operating in OS can access both Jobname and Stepname, or obtain the Parm parameter from the Exec statement in the Job Control cards. A return code can be passed by another subroutine for OS Cobol, Datasonics said.

The RPG Aids package subroutines allow the user to obtain the date and time, compute and edit the date, and control abnormal terminations. The OS-oriented RPG user can obtain the Parm parameter and pass a return code.

The routines require from 2K to 24K bytes of core each. Cobol Aids costs $600 for the OS version, $500 for DOS. The RPG Aids costs $400 for the OS version, $300 for DOS.

Purchased together, Cobol and RPG Aids cost $800 for OS, and $640 for the DOS version. Datasonics is at 663 Fifth Ave., 10022.

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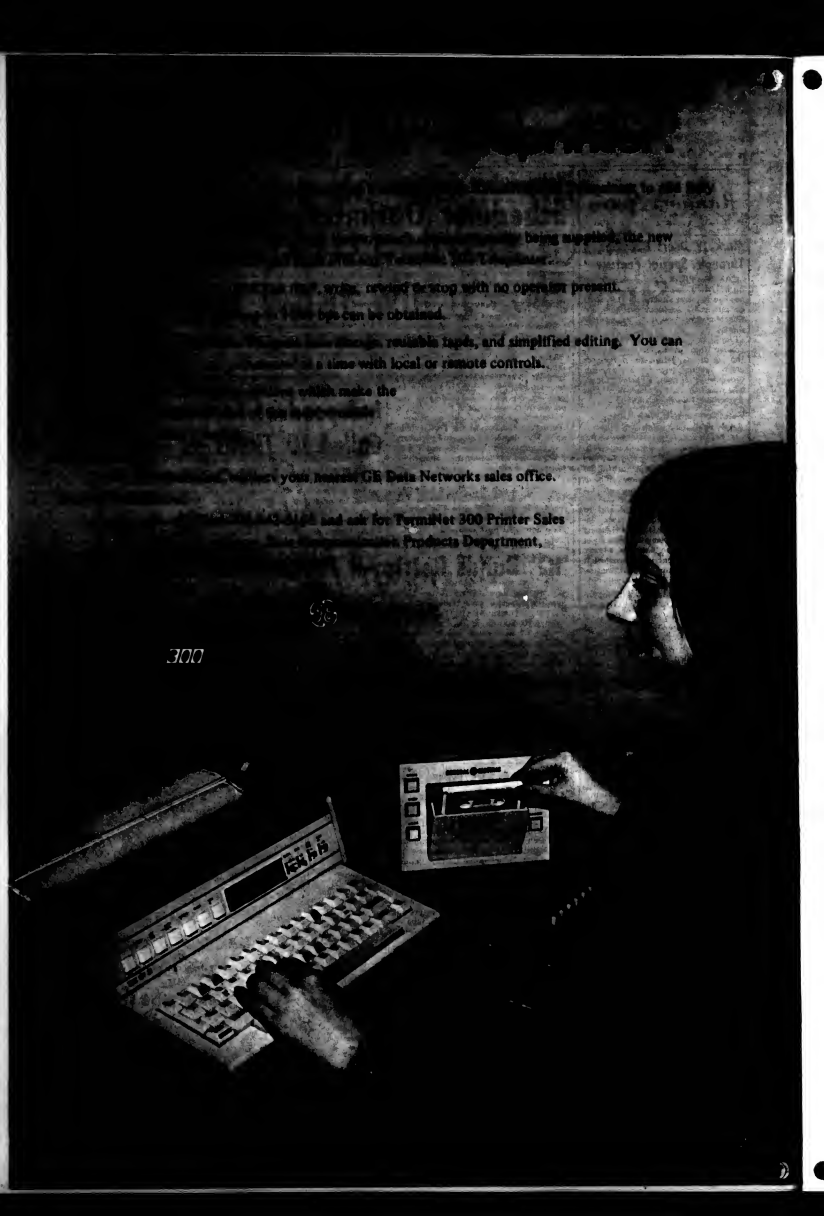
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WTSC Routines Cut Coding Time, Effort

By a CW Staff Writer

PITTSBURGH – Several programming aids, designed to reduce S/360 coding effort and machine time, are available from Westinghouse Tele-Computer Systems Corp. (WTSC).

The Coburef post-compiler processor, uses the Syspri output of an ANS or Cobol F compilation and adds cross reference and index information to the source listing. An optional index list shows all file data and procedure names, and literals in collating sequence, giving type, where defined and where used.

The Program Interrupt Processor (Piper) is a routine that is CALLed whenever a data exception occurs during a test session. Piper applies a set of standard rules to correct the bad data field.

Then it reexecutes the interrupted instruction so the test session is not terminated by a technical error unrelated to program logic.

Said to be particularly effective with Cobol programs, Piper zero-fills blanks in numeric data fields, and adds positive sign bits to unsigned data to clear data exceptions related to mathamatical operations.

Piper, which runs only under OS/360, reports the number and locations of the fixes it made at the end of each session. If the same error is encountered more than 50 times at the same location, however, Piper will ABEND the session.

Two versions of Tabtran are available to translate specially formatted decision tables into Cobol or Fortran source code. Tabtran is said to provide complete table editing, including the diagnoses of contradictions and redundancies.

Coburef takes less core than the compiler. Available in separate OS and DOS versions, it costs $200.

Piper adds 3K to the OS region needed by the application program being tested. This package is available for $300.

The Tabtran versions for generating Cobol or Fortran are written in those languages, and can be used in either DOS or OS/360. The Cobol package can be bought for $3,900, the Fortran package for $3,200. Users purchasing both are charged only $5,500, WTSC said. The company is at 2040 Ardmore Blvd., 15221.

'Crammit' Macros Handle Isam

WOODLAND HILLS, Calif. – IBM 360 users can create and reorganize Index Sequential (Isam) files through macro entries, with the CBIS Relocatable Access Modules for Maintenance, Isam Technique (Crammit) software from CBIS Information Systems.

Crammit reorganizes any Isam file so that all records are in the prime data area. The package drops all records flagged for deletion by earlier processing cycles.

Any character or group of characters in any record position in a file may be used as the deletion flag since parameters within the macro define the flag.

Crammit can be used to create an Isam file from any fixed record length sequential (Sam) file. By reversing that procedure, the user can prepare back-up Sam files for any Isam file.

Tailored to the user's requirements, Crammit supports IBM 2311 and 2314 compatible disk storage devices. The package provides statistics, including record counts, deleted record counts and a description of the disk extents allocated to the file.

Crammit is written in BAL and is self-relocating. The $250 package operates under DOS on a model 25 or larger 360. CBIS is at Suite 307, 6335 Topanga Canyon Blvd., 91364.

Operating Systems Aid Various Minis

PALO ALTO, Calif. – Users of Data General Nova/Supernova, DEC PDP-11, or Lockheed Mac-16 minicomputers can consider two operating systems from Xebec Systems Inc. Although they provide control over all the mini-makers' peripherals, they do require Xebec devices to make them function.

The Disk Operating System (XDOS) is based on the Xebec moving head disk systems, while the Cassette Operating System (XCOS) functions in conjunction with the Xebec cassette tape drives.

XDOS is said to allow the mini user to create and manipulate named files on disks. In addition to permitting filing, maintenance and access to files, XDOS allows the user to create, load and debug programs through any of the mini peripherals.

The mini-maker's language processors are all CALLable through XDOS, Xebec said. The system dynamically allocates storage so that programs and individual subroutines are overlaid from disk.

While XDOS is geared to disk files, XCOS is said to provide the user with low cost magnetic tape capability.

The cassette tape hardware comes with one to four drives sharing a common controller. They are said to permit record and file back-spacing, and read-after-write for transfer verification.

Standard software includes I/O drivers and a diagnostic package. The mini-maker's language processors are CALLable for program development under XCOS.

The cassette hardware costs from $2,500 to $6,800, while the moving head disk systems start at $9,450. The XDOS and XCOS are each priced at $1,500, from Xebec at 918 N. Rengstorff Ave., 94040.

Standard for Date Format Gets Formal Ansi Approval

NEW YORK – The American National Standards Institute (Ansi) has approved, as expected, a representation for calendar date and ordinal ("Julian") date to be used for interchange of data between data systems.

The new standard calls for numeric calendar dates to include year, month and date, in that sequence. The complete year field would be four digits, but could be limited to two digits if the century is understood, or a single digit if both century and decade are understood.

The month and the date field are each two digits long.

The standard generally follows the international standard already accepted by ISO.

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Private DAAs Delayed

WASHINGTON, D.C. – AT&T has agreed, with obvious reluctance, to an additional 90-day delay in the effective date of Tariff 260 revisions under which it would require installation of Data Access Arrangements (DAAs) for the interconnection of user-supplied equipment on private lines.

The FCC Common Carrier Bureau requested the delay so it could give "adequate consideration" to questions raised by those asking suspension of the changes. The carrier told the bureau that, while it was willing to delay the changes, it felt they should be authorized and any new conferences with the FCC should be held promptly.

AT&T argued that all the previously-developed findings of the commission and the National Academy of Sciences interconnection panel would effectively be disregarded if the pleas for suspension of the proposed tariff revision were granted.

The proposal that DAAs should be installed on private lines was first proposed to be effective July 1, 1970, but AT&T asked for a year's delay before the FCC acted on the proposal. Pleas from users who challenged both the need for protection, and AT&T's proposed method of providing the protection, rallied the effective date further back, to August 15. The new 90-day delay means the revisions won't become effective at least until November 15, 1971.

Xerox Urges FCC Action

Tariff Should Allow International Data

By Don Leavitt
Of the CW Staff

WASHINGTON, D.C. – Xerox has urged the FCC to lift restrictions currently imposed on international transmission of data and facsimile signals, and both Western Union International (WUI) and AT&T have told the commission the idea is a reasonable one.

In a letter to Bernard Strassburg, chief of the Common Carrier Bureau, Xerox noted AT&T Tariff 263 currently restricts international calls made over the public telephone network to voice transmissions. Users wishing to send data overseas have to either lease dedicated private lines or rely on "cumbersome procedures utilizing multiple carrier facilities," the letter said.

Many users cannot economically justify a dedicated line, although they have significant requirements for demand type

Communications

service. Other users have needs that cannot reasonably be met through any alternatives now available, Strassburg was told.

WUI reminded the commission it has had an application pending since 1965 to provide data and facsimile service on an international basis through the public telephone system.

The carrier said while it backed the concept, it felt the implementation should be through the international carriers of record.

AT&T, not currently an international carrier, noted applications and tariff revisions to allow international dataphone service would be filed with the FCC as soon as it was practical to do so. A Long Lines Department spokesman said that Xerox was not the only customer who had expressed an interest in such service.

No decision on the Xerox proposal is expected until the FCC has heard from the other international carriers. No deadline was set for the comments which were requested by the commission on an informal basis.

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Data Briefs

Varian Front End Offers Choice of Processors

IRVINE, Calif. – The 620/DC from Varian Data Machines is a time-multiplexed system that functions either as a data concentrator or a communications preprocessor.

The unit utilizes either a 620/L or a 620/f mini to provide master communications line control, but most of the data manipulation for individual lines is done in the 620/68 communications controller, also part of the 620/DC. Prices vary with choice of mini and peripherals. A 32-line system based on the 620/L will cost about $30,000. Varian is at 2722 Michelson Drive, 92664.

Unit Supports 2,400 Bit/Sec

WOODBURY, N.Y. – A modem designed to be used in synchronous applications requiring 2,400 bit/sec data rates, the Model 883P from Tele Signal Operation of Singer also supports 1,200 and 1,000 bit/sec speeds.

A feature provides for multi-party operation. The unit can be changed to a di-phase modem at half-rate by a rear panel switch, by remote control through the EIA interface, or through board restrapping, the company said. Both manual and automatic Data Access Arrangements (DAAs) can be accommodated on the $795 unit, from 250 Crossways Park Drive, 11797.

Astrocet 110 Sends 300 Bit/Sec

ST. PAUL, Minn. – The Astrocom Corp. has an acoustic data coupler, the Astrocet 110, compatible with Bell 103 and 113A data sets. The 110 provides originate-only data communications at transmission rates to 300 bit/sec. The device has EIA RS 232B and TTY interfaces.

The 110 costs $298 from 293 Commercial St., 55108.

Ultronics Has New 'Data Pump'

MOORESTOWN, N.J. – A low-cost, 300 bit/sec data set compatible with Western Electric 103 series modems, the Data Pump 103/300 is available from Ultronic Systems Corp. It is an asynchronous data set that operates full or half duplex over the public phone network, or leased voice-grade circuits.

Acoustically coupled originate-only models are available for $388. Originate-only and answer-only versions for hardwired connection through data access arrangements (DAAs) can be purchased for $335. The company is in Mt. Laurel Industrial Park, 08057.

Bits and Pieces

Ten Key Numeric Pad Rues On Ascii Terminals

BRENTWOOD, N.Y. – A ten-key numeric keyboard that operates in line or local mode through any Ascii-coded terminal while the terminal keyboard remains fully operable, Eastern Dynamics Corp.'s pad features a single key carriage return, line feed, rub out, and X-off. There are also eight option keys for selection of 64 functions or symbols. The unit is designed for users with heavy numeric input. The pad costs $296. Eastern Dynamics is at 1158 Suffolk Ave., 11717.

Packs for 3330s Leased

PAOLI, Pa. – Users will be able to lease disk packs for the IBM 3330 from another supplier, Data Funding, Inc., or full payout or short terms. IBM will only sell the disks, for $1,000 a throw. The company says it has a protected delivery schedule for $1 million of the disks. Data Funding is at Station Square Two, 19301.

Unit Lets Mini Run 2314

SANTA ANA, Calif. – The Eeco Model 1600 disk drive controller allows Interdata Model 4 and 5 minicomputers to control IBM 2311 and 2314 type movable-head disk drives. Prices for the controllers start at $7,500, with delivery in 30 days. Electronic Engineering Company of California is at 1601 E. Chestnut Ave., 92701.

Memorex Cartridge Threads Tape

SANTA CLARA, Calif. – A self-threading tape cartridge from Memorex is completely compatible with IBM's 2420/3420 tape drives. The cartridge reduces tape mounting time and offers increased reliability and operating efficiency, according to Memorex. The cartridge is completely sealed and remains fastened to the reel during handling and storage. Also available with tape, the cartridges empty cost $5 a piece in small orders and $3.25 in quantity. Memorex Corp. Computer Media is at 1200 Memorex Drive, 95052.

Key-Edit Totals Up to 15 Fields

WALTHAM, Mass. – Multi-batch, multi-field totaling is an optional feature newly available on Consolidated Computer's Key-Edit family of data entry systems. The supervising operator can initiate an accumulation of up to five batch totals.

The feature costs an additional $100/mo. Consolidated is at 235 Wyman St., 02154.

Interdata 70 and 80
Two Minis Have High Speed

OCEANPORT, N.J. – Interdata will announce two 16-bit minicomputers early next month, the Models 70 and 80, with memory cycle times of 1,000 and 350 nsec respectively.

A future option for the Model 80, which uses semiconductor memory, will be dynamically alterable microprogramming, according to Interdata. Minimum memory size on the Model 80 will be 16K (bytes).

Both machines offer a 64K direct memory addressing range, 16 general registers, eight floating point registers, and 16-or 32 bit instruction sizes. The instruction repertoire has 113 commands.

Hardware multiply and divide, floating point arithmetic, list processing instructions, interleaved data channels, immediate interrupt, and automatic I/O are standard.

Both machines are fast. The Model 70 has register-to-register execution times of 1 μsec, and register to indexed data execution times of 2.25 μsec. For the Model 80 the respective times are 400 and 500 nsec.

Memory access times are 300 and 250 nsec, respectively.

The Model 70 costs $6,800 with an 8K memory. Memory can be expanded to 65K. The LSI-bipolar ROM used to store machine instructions has a cycle time of 250 nsec. A double-buffered TTY interface and a direct memory access port for up to four channels are standard.

The Model 70 will be available for delivery in September. First delivery of the 80 is planned for the second quarter of 1972.

The 80 has TTL Schottky logic and an MOS-LSI main memory. Interdata plans to announce in the fall an option for the 80 that would enable users to alter the microprogramming of the machine during the execution of a program.

Base price of the Model 80 with 16K is $16,000.

Interdata is also offering a real-time operating system, as a $2,000 option.

Interdata is at 2 Crescent Place, 07757.

Wavetek T-500

Press Tone Terminal Sends Alphanumerics

SAN DIEGO, Calif. – A Touch-Tone type terminal with full alpha-numeric capability, the Wavetek T-500 is a low cost means of entering data to on-line audio response systems. The T-500 has a 49-key keyboard containing letters, numbers, punctuation marks and special characters.

This is the first alphanumeric Touch-Tone type terminal, according to Wavetek.

The unit has a speaker and volume control to receive messages from the audio response system. An acoustic coupler or Data Access arrangement is necessary for use on a common carrier network.

The T-500 generates audio code for each keystroke, and has circuitry to restrict sending of code when more than one key is depressed at a time. Purchase price of the unit is $700, and lease terms are available. Delivery is in 90 days from Wavetek Data Communications, 9045 Balboa Ave., 92112.

Delta Data to Vend TTY Sub, Device Controller for XDS Units

CORNWELLS HEIGHTS, Pa. – Designed as a teletypewriter replacement, Delta Data Systems' TelTerm 33 CRT display can handle up to 27 lines of data at 80 char/line. A blinking feature is standard, and the unit has a numeric pad in addition to the standard teletypewriter keyboard.

Standard transmission rate is up to 600 band, and optionally up to 9,600 baud. The unit is completely compatible with software that has been developed for teletypewriters, Delta Data said. In addition it will handle strike over and blink.

The Telterm 33 works in conjunction with the company's MultiTerm 1, which is used for cluster display environments. Delivery is in 30 days.

The unit sells for $2,750 and leases for $110/mo, including maintenance.

Delta Data also announced a device controller to adapt Telterm terminals to all Xerox Data Systems Sigma computers. The controller interfaces to the multiplexer I/O processor 8-bit channel.

The controller can drive 16 displays in half-duplex, byte parallel, or message serial mode. Transfer rate is up to 500,000 char/sec. It is mounted inside the XDS mainframe, and draws power from the computer's supply.

Data and command chaining are possible with the device controller, as are detailed status reports. Software is supplied for the system loader and for system diagnostics.

The device controller costs $7,000, and delivery is in 60 to 90 days.

Delta Data Systems is in the Woodhaven Industrial Park, 19020.

CDC Cuts 200 Series Prices

MINNEAPOLIS, Minn. – Control Data has reduced the purchase prices of all its series 200 CRT terminal products. A CDC spokesman said the reductions averaged about 33%.

Included in the cut are multistation CRT controllers, displays and associated peripherals for CDC 1700, 3000, and 6000 series mainframes.

The purchase price reduction also applies to CDC's Terminal Operations Control System multistation products used on IBM 360/370 mainframes, as well as the their 200 remote batch terminal.

Under the new prices a 1,040 character display will full editing capabilities costs $2,500. The previous price was $3,900. A 136-column, 300 line/min double buffered printer now costs $11,550, and a local transmission controller that replaces IBM's 2848 or 2701 costs $9,700.

The 200 User remote batch terminal with a 300 card/min reader, 300 line/min printer, and 1,000 char CRT, as well as these 1K buffers, costs $23,000. Previous price was $34,000.

Rentals are not affected by the price cut..

Add-On Memory Offered For 360/22, 30, and 50

WARRINGTON, Pa. – Computer Hardware Consultants & Services' Model 3768 storage unit is a core memory replacement fog IBM 360s with 1.5- and 2 μsec cycle times. These include Models 22, 30, and 50.

The 3768 uses 22 mil lithium-ferrite cores, and is available for purchase or lease. Installation will not interfere with existing IBM maintenance contracts.

A 32K (byte) upgrade module costs about $26,000, the company said, and is available for immediate delivery.

CHCS is at 1409 Easton Road, 18976.

Pocket-Sized Data Testers

This is Data Products' new portable communications test equipment: the 404 Pattern Generator and the 404 Data Analyzer. Pocket-sized and priced under $500 each. High capability. True start-stop distortion measurement with choice of four selectable rates and 5- and 8-level "Fox" test messages.

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Eight Novar Terminals Handle Variety of Jobs

MOUNTAIN VIEW, Calif. — The Novar 7-70 data collection terminal transcribes data from Novar terminals to computer compatible tape, and the 5-60 terminal is an Ascii-compatible unit based on a Selectric typewriter. The two units are among eight introduced by Novar Corp.

The 7-70 receives information by telephone lines or hard wire, and records it on 1/2 in. tape at 9 tracks and 800 char./in. There is a provision for variable record lengths, and coding is in IBM format. The unit is based on a minicomputer.

When transmitting, the 7-70 has automatic error checking and re-transmission as standard features. There are also provisions for placing users' editing routines in memory. Sale price is $9,990, and rental is $315/mo.

In addition to the Selectric, the 5-60 has a 350 char. buffer, and built-in tape recorder and modem. Transmission rates range from 110 to 2400 baud.

According to Novar, the terminal can provide substantial savings to the user by putting data in the off-line tape drive at the slow keyboard rate, while the tape transmits to the computer at high speed, cutting down on line charges.

In the receiving mode, computer data can be recorded on the tape at high speed, and then printed out at 15 char./sec after the phone line is disconnected. The 5-60 sells for $6,950, and rents for $199/mo.

The 5-10 Touch Tone telephone translator allows users to make a remote entry keyboard out of a Touch Tone phone. The user connects to a Bell 403 dataset that is in turn connected to the 5-10. Then, by using numerics and two auxiliary buttons on the phone, he may enter data. He signs off by hanging up.

Where the phones are not available, Novar offers a Touch Tone adapter at a nominal charge. The 5-10 sells for $990 and rents for $30/mo.

The 5-11 recording adding machine is an off-line source data terminal made of an adding machine and a Novar tape cartridge. The tape is buffered, permitting corrections to be made in keyed data before it's recorded. The data can be transmitted by putting the cartridge on a Novar 5-50 or 5-51 terminal.

Selling for $2,740 and renting for $65/mo, the unit is designed for accounting oriented transactions, such as business or auditing.

The 5-12 recording typewriter consists of a typewriter and tape cartridge, and is also buffered. It operates in a manner similar to the 5-11, and is an entry terminal only.

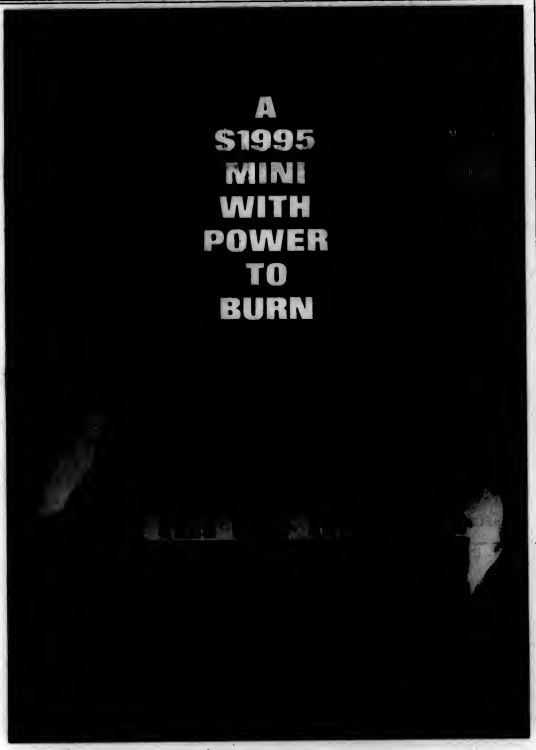
The Selectric-based unit sells for $3,500 and rents for $95/mo.

Designed primarily for on-line polling and addressing systems, Novar's 5-40 Mod II data communications terminal offers block checking and automatic error correction. It is completely compatible with software written for IBM's 2740, Novar said. Internal buffer capacity is 130 char., optionally expandable to 790 char. Selling price is $4,400, and rental is $125/mo.

The last unit announced is the 5-80 auxiliary printer, made to be used with buffered data communications terminals.

The printer sells for $4,400 and rents for $125/mo.

Novar is at 2370 Charleston Road, 94040.



System for Small Business Requires No DP Experience

GREAT NECK, N.Y. — A turnkey minicomputer system for small business use is being offered by Computer Intersections, Inc. The system requires no programming, systems or operations experience by the user, the firm said.

Available applications include sales order entry, billing, accounts payable and receivable, inventory and control, payroll, sales analysis, mailing lists, and financial accounting. The system operates in a conversational mode.

Price is "in the low $60,000 range." Computer Intersections is at 425 Northern Blvd., 11021.

Tool for Warriors

West Pointers Go Interactive

WEST POINT, N.Y. – A data communications network is supplying West Point cadets with the necessary weapons to continue the tradition of academic excellence which surrounds the U.S. Military Academy.

Bulwark of the USMA Academic Computer System is an 85-line time-sharing system employing 65 General Electric TermiNet 300 teleprinters. These interactive terminals give cadets access to the computer 24 hours a day, seven days a week to help them solve complex problems in a variety of academic subjects.

The Academy's communication terminals are strategically located at more than 20 areas on the campus in clusters containing from one to 15 units. These clusters serve living, study, office and laboratory areas.

The terminals are connected to the Academic Computer Center's Honeywell-635 computer.

The Academy's four year interdepartmental computer program begins for all cadets in the first year when the Department of Earth, Space and Graphic Sciences teaches a 45-hour course in computer fundamentals.

This course instructs cadets in the use of equipment, as well as how to write programs in Fortran.

LTC Harold C. Hannaway, director of the Instruction Support Division, the parent headquarters of the Academic Computer Center, explained the philosophy of the Academy in making the course compulsory in the early stages of a cadet's career by saying "much as he is taught the slide rule or how to fire a weapon or drive a truck, we believe that in this age of technology, every cadet must be taught how to use a computer in a variety of teaching situations."

In his four years at the Academy, a cadet may invest on the average of 100 hours using a terminal to help him solve assigned problems in mathematics, physics, electrical circuit design, chemistry, engineering design and in a variety of other courses in social science, history, etc.

The Academy's computer assisted instruction program took a giant step forward two years ago when the Academy installed its present multi-programmed computer system and procured additional communication terminals.

Unrestricted Access

"Perhaps the most important step we have taken at the Academy involves the unrestricted access of the computer given to the faculty and cadet," stated Major Dave Gledhill, associate director for the center.

"This access allowed our instructors to construct programs that fit the needs of their particular disciplines, and it has encouraged cadets to use the time-sharing system on their own time.

"During a recent open house, for example, many Plebes brought their parents, guests and girlfriends over to the Computer Center and very proudly conducted their own tours on how the facility was used and demonstrated their newly-gained expertise on the terminals."

"It used to be that many hours of an instructor's time had to be devoted to the administration of remedial instruction; but, again using the facilities available at the Academy, cadets will soon complete the remedial course at their own pace, with the computer supplying both the questions and the answers plus evaluating progress," Major Gledhill said.

Courses now being offered through this interaction program include courses on German vocabulary, use of the slide rule, and a drill on complex numbers.

USMA will reach its peak enrollment of 4400 in 1972. The Instruction Support Division's Academic Computer Center will be ready to meet the growing needs of both faculty and cadets as well.

At that time, some 1400 cadets in their first year, plus 3000 others in the upper core and elective courses will be using the communications terminals and time-sharing system simultaneously. But Major Giedhill believes the system is equipped to handle that kind of load.

As Major Giedhill noted, "We believe the ability of a West Point graduate to use a computer and a communications terminal correctly will be of massive importance to him in his future whether that be at graduate school or in a staff and command assignment. It is as important for a military man today to be as knowledgeable in the use of computers as in battle tactics."

Cadets use terminals available in barracks' areas as well as laboratories and classrooms.

DP on Blight Lookout

FULTON, Mo. – An advance guard against corn leaf blight and other corn diseases has been established with the aid of 20 scattered corn plots, a computer and bi-weekly aerial infrared photographs of the plots taken from Nasa planes.

The plots will be checked weekly by agronomy specialists and their reports and the photo data are submitted for computer analysis.

The plots include plantings of two dates, with varieties chosen for either susceptibility or resistance to the various diseases. Researchers indicate the study should provide short-range warnings as well as long-range study data.

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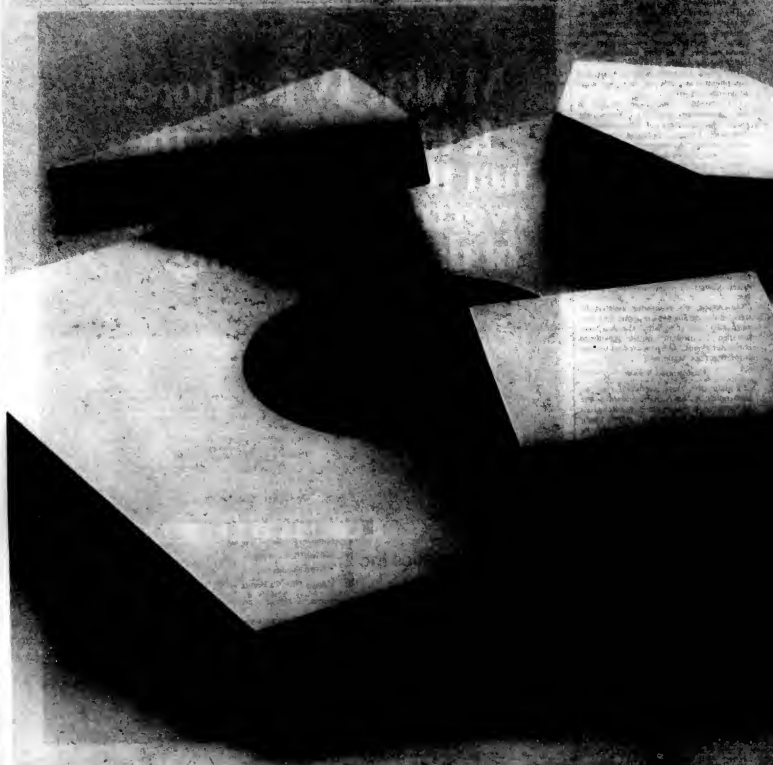
CW-1

Compatible.



We look the word just [illegible] seriously.

[illegible] read [illegible] core [illegible] told to buy [illegible] Passed of going [illegible] You've [illegible] told that all it [illegible] a connector [illegible] processing [illegible]

But expansion [illegible] memories [illegible] the solution to every system throughput [illegible]. If it appears that they *will* solve your problem, then you still face two complex decisions:

Evaluating the best design. And [illegible]ecting the best resource.

So what makes Electronic Memories [illegible]ferred resource for IBM-compatible [illegible]ories?

The reasons we're a preferred re- [illegible] the same reasons it took us so long [illegible] line of compatible memories. [illegible] to lose than the others. [illegible] & Magnetics [illegible]

computer industry. [illegible] product line, we risk that [illegible]. And we don't do that lightly.

We're [illegible] dent manufa[illegible] And core [illegible] customers include [illegible] high speed main frame [illegible] We process core products in our own facilities around the world. And as a disk pack manufacturer, we've established sales and service to over 2,000 data processing centers.

All that experience makes us very [illegible]. About a word like "compatible" [illegible]

[illegible] We've [illegible] "[illegible]" that [illegible] unit by [illegible] memory [illegible] data transfer. In no way do we violate existing hardware.

To us, that's true "compatibility."

We're equally cautious about the word "reliable."

So our [illegible] use our [illegible] proven in years of [illegible] by one of [illegible] commun[illegible]

[illegible] into our [illegible] ently of the [illegible] performance [illegible]

All [illegible] considering. [illegible]

Perhaps [illegible] for considering [illegible] Electronic Memories [illegible] designed and built by [illegible] We make the core. We [illegible] We assemble and test [illegible] sell. We lease. And we [illegible] for installation and for [illegible]

Let's hear from [illegible] find it refreshing to [illegible] memories with [illegible] longer — because we [illegible] more seriously.

[illegible]

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The new TELEX 5600 Disk Storage System doubles the storage capacity of present IBM 2314-type systems. The 58 million bytes per drive capacity is provided by doubling the number of cylinders, while maintaining track and format compatability. The TELEX 5600 Controller accepts one to eight active drives plus a spare, for a total subsystem capacity of 466 million bytes.

TELEX has eliminated possible arm contention and pack mount/dismount complications of a two volume per drive approach by treating each drive as a single 406 cylinder volume. And, TELEX will supply modifications to DOS and OS *at no charge*. Although these modifications are minor, they mark the entry of TELEX into the area of software support.

TELEX can promise you minimum down time on the new 5600 Series. First, because in-line diagnostics permit drive failure analysis concurrent with normal control unit operation. Second, because TELEX, *The* Peripheral Company, has the largest and best service staff in the peripheral industry, providing nationwide, around-the-clock service.

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COMPARISON

IBM 2314 vs. TELEX 5600 Disk Storage System:

	IBM 2314	TELEX 5314	TELEX 5600
Access Time			
Minimum	25 ms	10 ms	7 ms
Average	60 ms	32 ms	29 ms
Maximum	130 ms	60 ms	55 ms
Start-up Time	60 sec.	20 sec.	20 sec.
Storage Capacity (per drive)	29 million bytes	29 million bytes	58 million bytes
Disk Speed	2400 RPM	2400 RPM	2400 RPM
Data Transfer Rate	312,000 Byte/Sec.	312,000 Byte/Sec.	312,000 Byte/Sec.
Tracks	200	200	400
Storage Medium	IBM 2316	IBM 2316	IBM 2316

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COMPUTERWORLD

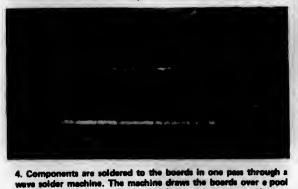
1971 Minicomputer Supplement

August 25, 1971

1. The initial phase in making a minicomputer is the layout of circuit boards and logic modules. The printed circuit boards are designed in enlarged form and then photographically reduced to give the needed accuracy.

The Making of a Mini

2. Once the boards are etched, the plug-in contacts are gold plated. Gold because it's the best conductor of electricity.



4. Components are soldered to the boards in one pass through a wave solder machine. The machine draws the boards over a pool of molten solder making hundreds of connections in seconds.

7. Final assembly begins with the mating of power supplies to the sheet-metal cabinets.

Photos courtesy of Digital Equipment Corp. and Data General Corp.

Mini's Power Still Unexploited

By Michael Merritt
Of the CW Staff

They're everywhere . . . on the plant floor, in the terminal, throughout the time-sharing system, in the schools . . . minicomputers.

And they're going to be in more places. In the past year minicomputer prices have continued to drop. Texas Instruments' boast of a "computer on a chip" and Digital Equipment's introduction of a processor selling for as little as $800 are harbingers of the day when minicomputers will be components as common as telephones.

But even today the capabilities of cheap data processing power are far from being exhausted.

Minicomputer control of individual processes in a plant is just beginning to be tied into a data processing network.

The advantages of mini-based in-house time-sharing systems are just beginning to be realized.

Manufacturers have just started using extensive processing power in communications and DP networks, taking housekeeping chores away from expensive large computers and giving them to minis distributed in the system.

And the advantages of local data processing power to the small businessman have barely been touched.

So CW's 1971 Minicomputer Supplement is about what you can do with minis today . . . where you can use them . . . how you select them . . . what sort of processing power to get, since minis, calculators and terminals are starting to blur together . . . and how not to get lost when traveling in unfamiliar territory.

Minis have come a long way since their first appearance in the early 1960s. In less than 10 years the number of manufacturers has blossomed to over 60, and nobody has counted the number of independent suppliers of software and peripherals.

Minis have long been the province of sophisticated users, but the boom of the last few years has changed all that. There is software, there are peripherals, there are consultants and analysts, all waiting to make entry into the world of minicomputers as easy as possible.

The minis on this page show the state of the industry. Production is fast, highly automated, high volume, and inexpensive. This means inexpensive processing power for the user willing to take it. If you're interested in seeing what there is to use, read on.

3. Meanwhile, integrated circuits are automatically tested — using minicomputers. This automated tester checks out thousands of units an hour — with a bit of human backup.

5. After wave soldering, the boards are inspected and cleaned manually, and heat-sensitive components are added.

8. Then the front panel and the individual circuit boards are put in place. Most minis standardize plug-in boards — it makes upgrading and servicing simple.

6. All through the course of manufacture, minis and their components are tested, inspected, and checked. Here, large modules are tested, using minicomputers once again. To test the units manually would take 10 to 100 times as long — and wouldn't be so reliable.

9. Final checkout — again aided by computer. Here paper tape and a teletypewriter — almost universal peripherals for minis — are being used to exercise the final product prior to packaging and shipping.

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A Continuum of Processing Power

Minis, Calculators, Terminals, Time-Sharing: Which?

By Edward L. Maniatis
Special to Computerworld

Office equipment buyers often spend a fair amount of their time trying to decide whether a programmable desk calculator, a minicomputer, an intelligent terminal, or a time-sharing terminal is the best way to solve their computational problems. They know their decisions will be easier to make if they look carefully at the characteristics of each, and analyze who will use the device, and how he will use it.

The potential buyer should start by realising the programmable desk calculator, the minicomputer, and the large computer form a continuum of problem-solving ability – each has advantages in its specialty area, and there is a certain amount of overlap in the spectrum. Also, there are certain jobs that one can do that the other cannot, for instance, a desk calculator cannot control a process.

So a buyer's emphasis should be on relating each of these items to the problem to be solved, rather than trying to determine the "best" one for a multitude of tasks.

A desk calculator is very good for doing certain straightforward types of problems because it is designed to be task oriented. Its chief advantages include approximately 12-place accuracy and ease of entering data and reading the result. It can usually solve a straightforward problem about as fast as a small computer can – actually the computer operates much faster, but it takes many steps to arrive at a solution, while the desk calculator arrives at the same answer through one step – the push of a keyboard button that routes the numerical problem through a hardwired circuit that does the operation. Although this operation is much slower, the single step solution makes the throughput times comparable.

The desk calculator has some disadvantages, too. It solves problems one step at a time, and each step requires some intervention by the user. This limits the size of the problem that can be handled easily to a few steps. Also, without a peripheral, the only output is via a display – nixie tubes, electroluminescent panel LED's, or the like – a form of "soft" copy. Thus the basic calculator display has to be copied down in some fashion before it can be made permanent. This is, of course, a process subject to human error and is inefficient for large amount of numbers.

More than One Step

The programmable calculators permit certain routines to be carried out in a program somewhat like those used by computers; but in order to make the calculators function the operator has to follow a chart, entering the data at the appropriate step pauses. This user intervention is a process that is open to possible human error – not only in possible miscntries, but also in possibly entering the same term for two successive steps. Again, the results are usually presented in soft copy.

The minicomputer, while solving problems one step at a time like the calculator, does not require the user to intervene at each step. Because it offers a high-level language to work with, conversational minicomputer programs can ask the operator questions, using words and phrases commonly used in his application.

Aside from letting relatively unskilled people use the computer, the interactive questioning helps keep human error to a minimum. Calculators, on the other hand, are function oriented, and require the user to

(Continued on Page 5/11)

Accessing, Indexing, and Interrupts Are Important to Small System Jargon

By a CW Staff Writer

Like many areas of the data processing field, minicomputers have a jargon all their own. While a general knowledge of computers might see a user through a sales pitch, an intelligent selection of a machine requires for depth of knowledge.

Accumulators are plain old registers that hold an operand and permit arithmetic and logical operations to be performed on it. For example, if quantity A is in an accumulator, and quantity B is added to the accumulator, it then contains A+B. Movement of data from an accumulator is faster than movement from memory, so the larger the number of accumulators, the greater the power of the mini.

Since minis have short word lengths compared to full size computers, there is a serious problem with the number of memory locations that can be specified in an instruction word. One way this is solved is *indexing*.

The instruction word contains part of the address, and a special index register contains the rest of the information needed to pinpoint the data. The number of index registers, then, is a measure of a machine's flexibility.

The index registers may be special registers, portions of main storage set aside for indexing, or accumulators that also serve indexing functions.

Indexing, though, may increase execution time, so the number of *directly accessible words* is significant. This depends solely on the number of bits allowed in the instruction to specify an address. If only eight bits are allowed, only 256 memory locations can be specified directly. One alternative to this bind is using multi-word instructions, something like double-precision arithmetic.

Another alternative is *indirect addressing*, where the specified location actually contains another address. The data in the second address may be an operand, or still another address – in which case you have *multi-level indirect addressing*.

By putting the true address in memory, you can use an entire word to specify a location. There is a trade-off, though. Each level requires an additional cycle, so execution may be slower; on the other hand, the addresses of a whole slew of data can be altered in one instruction by altering the original indirect address.

Immediate or *literal instructions* don't use the address section of an instruction word to specify an address, they use it to hold the operand itself. This saves storage space and obviates one memory cycle.

Power failure protection is self-explanatory, and becomes significant in real-time applications where it shuts down the computer without destroying memory or register contents. It often comes with an automatic restart feature.

I/O word size – the number of bits transferred in parallel in an I/O operation – is almost always the same as basic word length. It determines the ease of interfacing to peripherals, as well as affecting the data transfer rate.

Direct memory access allows I/O operations to go straight to or from memory without tying up a register in the CPU. Memory transfer, once initiated, proceeds independently of program control. This generally gives faster data transfer rates, and cuts down drastically on hardware overhead.

Program interrupts, while necessary for I/O operations, become critical in real-time applications. An interrupt is a signal to the main processor to suspend program execution and attend to the condition causing the signal. This can be an internal condition parity error, power failure, illegal instruction, and so on – or

(Continued on Page 5/12)

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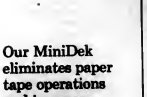

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Cross Assemblers, Packages Make Minis Flexible

By Donald Leavitt
Of the CW Staff

The hardware manufacturers and the independent software vendors have finally begun to make the mini a generally useful tool for the end user by providing enough good software so he can program the machines easily.

The OEM and dedicated application area hasn't been neglected, but the end user has gained the most software support in the last two years.

The support stretches all the way from higher level compilers or assemblers, and operating systems, through cross-assemblers and simulator packages for use on full-scale 'host' CPUs. A number of application packages for business data processing have also been made available to mini users.

The languages that are being implemented on the minis are often subsets of the "standard" languages used on full-sized mainframes. Some include unexpected, but nonetheless effective surprises.

When it strengthened the end user's capabilities by adding Fortran to the Nova line last spring, for example, Data General also provided Algol, the European and academic language, rather than Cobol. Hewlett-Packard also went the Algol route, for its batch-oriented users, with Basic for time-sharing.

A variant of Basic can be used in a single terminal system. Other compilers include Fortran II and Fortran IV.

DEC's latest release of normally scientific Fortran IV for the PDP-15 includes features the company said make it particularly useful for business data processing.

PL/I for Novas

So that one user could program his IBM 360s and his Novas in the same language, Softech, Inc. of Waltham, Mass., built a PL/1 compiler for the Data General machines. Using its AED "software engineering," Softech said that it could construct almost any kind of language processor for any CPU.

Operating systems are generally designed to ease time-sharing or multiprogramming operations, or to handle the growing range of peripherals that are available.

The Master Operating System for the Varian 620/i, for example, uses and supports a drum memory or a tape drive, but will also support line printers, high-speed paper tape readers and punches and card readers.

DEC's PS-8, for the PDP-8, allows the mini to be used in time-sharing to support an "expandable" number of peripherals. It includes absolute and relocatable loaders and a peripheral-interchange program, DEC said.

Hewlett-Packard has used a series of its minis to create the 2000 time-sharing systems. With Basic as its prime language, the 2000B includes a general business software system and an elementary mathematics instruction package.

Data General's introduction of a Disk Operating System was the first clue to that company's plans to add disk and magnetic tape capabilities to the Nova line.

Cross Assembly

Minicomputer users have been offered a wide range of cross-machine assembler packages that use varying combinations of "host" and "target," or source and object machines. These generally allow programs for a mini to be assembled, and in some cases debugged, on a general purpose mainframe.

This approach to program development gives the user two advantages, according to the vendors. First, the mainframe generally has faster I/O capabilities and better processing speeds than the mini, so the job can be done sooner. Beyond that, production work being done on the mini can continue undisturbed, if the user has another place he can do his programming work. The larger core size of the mainframes is used in some of the cross-assemblers to provide more efficient processing or to provide macro capabilities that couldn't be handled on the restricted mini memory.

Many of the cross-assemblers are geared to a particular host-target combination but at least two of the packages provide more flexibility than that.

Compata's Bias allows the assembly of programs for any CPU, mini or full scale, on any machine that supports ANS Fortran. Interfaces have to be developed for each target machine to be served by Bias.

Proprietary Software's Dual package has double flexibility. It includes meta-compiler capabilities so that the user can structure his own language. And Dual may include various "object converters" which generate object code for a particular machine. By replacing these converters, a user can write one source program, using his own terms through the meta-compiler, and have it run on any machine of his choice.

Specific Machines

Perhaps more typical of the cross-assemblers is Code Inc.'s Trans-sembler package which allows programs for Varian's 620/i and 620/f to be developed on almost any mainframe that supports Fortran. The company noted that this includes IBM's 360 and 7090, CDC's 6000, Univac's 1108, and XDS' Sigma 5/7, as well as the HIS 600 series.

Automated Technology has developed two assemblers. ATI-11 provides assembly of DEC PDP-11 programs on a 360. ATI-16 provides the same host for Honeywell CCD 16-bit machine programs.

Comptek Research, from Buffalo, N.Y., has Nomac and Novasm, which provide for the assembly and then the testing of Nova/Supernova programs on a 360 or a DEC PDP-10.

Programs available from the DEC User's Group are geared to assembling PDP-11 programs on the full-scale PDP-10.

Business Packages

The business-oriented applications packages that are becoming available are perhaps best illustrated by Hewlett-Packard's distribution of the Computer Library Application Services (Clas) software, originally developed by Western Data Sciences Inc. of Phoenix.

Used on the HP 2000 time-shared systems, Clas includes general ledger, bookkeeping, file maintenance, sorting, and financial planning programs.

The Minicomputer Business Package (MCBP) from Computing Corp. International of Englewood, Colo., is written in Fortran IV and is oriented to any of the 16-bit minis. MCBP includes 30 interrelated programs covering accounts receivable and payable, payroll and labor distribution, inventory control, and general ledger.

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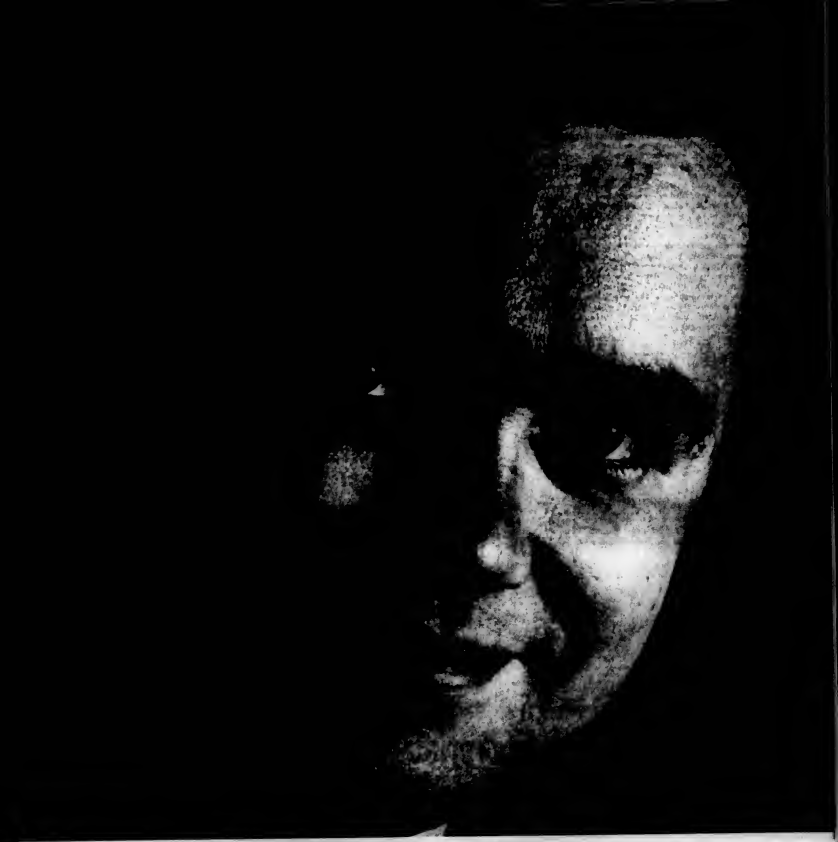

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Minis in Plant Save Money, Communicate

By Harry B. Randall and Edward L. Rudisill
Special to Computerworld

A key element to better production control in the Seventies is the small in-plant computer. Recent advances in economical sensor-based systems, able to communicate with both men and machines and with other computers, make it more practical than ever to justify start-up applications on the manufacturing or process line. The same small control computers can later be used as satellites in a total plant information system.

A plant floor computer should provide for growth, making it possible to start small with a stand-alone system monitoring a production "island" and, later, to broaden the application without scrapping the initial investment in equipment, systems design and programming.

Application growth can take several forms: More sensor inputs can accommodate additional machine tools, more data entry terminals can permit the system to reach out and tie together related functions in the plant, and greater data processing power can support add-on functions that call for more calculations or data storage.

Bottom Up

An integrated system can be developed in two directions: bottom up, one application at a time; or top down, linking the host system to each new application or function as it comes on stream.

By installing sensor-based computers on a unit basis for individual applications such as transfer line control, and growing to an interconnected system, production management can assemble the equipment, data base and experience required for a total production system, in modular steps, as desired. The route here is bottom-up, step-by-step evolutionary growth.

In the "top-down" approach, a firm already using a larger computer for production planning and scheduling can gain additional control by connecting its existing system to one or more sensor-based units on the plant floor.

A satellite system in final assembly, for example, can supply the host system with real-time information on production status, while the host provides scheduling data for use by the satellite in controlling individual production operations. In measured steps, the same approach can be extended to other areas in the plant, including material handling and testing operations.

The goal of any plant floor computer application is to achieve reduced unit costs, closer adherence to production schedules and improved control of performance. A production control system's basic function is to communicate with the plant floor to assure that actual production is meeting the plan, and to give management more direct control over operations.

The same system that monitors and guides production can also communicate the situation effectively to plant management. The plant floor computer provides timely and accurate data from the production islands directly to management and, by exception reporting techniques, it can bring into early focus those problems which prompt management action can solve.

In general, a plant floor computer application should provide some or all of the following functions:

- Recognition of events as they happen – real time collection of data from machine sensors and manual entry devices
- Retention of data for analysis
- Comparison of data against plant production schedules to determine if action is required
- Control action – either direct machine control or messages, lights and displays for operator guidance
- Periodic exception reports, end-of-shift summary reports, and answers to local and remote inquiries.

H.B. Randall and E.L. Rudisill are with IBM's Data Processing Division in White Plains, N.Y., where they are concerned with the small, sensor-based System/7.

The plant floor has long been the home of minicomputers like this 1800 System/7. But now, as well as running a drill press or keeping an inventory, minicomputers are becoming part of an integrated data processing system.

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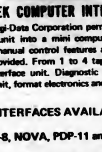

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Cheapness, Flexibility, and Languages Make Small Systems Interesting for T/S

By Gerson Rafer
Special to Computerworld

Because of its relatively low cost and ease of use, a minicomputer-based time-sharing system may be an attractive prospect for an organization with a large community of users. It is readily accessible, and has many languages available to facilitate program writing for various departments in an organization.

Additional, and often overlooked, advantages provided by an in-house mini time-sharing system are:

- Cost insensitivity to increased usage
- Economical access with protection of sensitive data
- Elimination of arbitrary storage cost
- Common data basis
- Accessibility of common programs.

Another advantage is file management, inherent within mini time-sharing systems, and immediate accessibility of programs, prevents the mammoth waste of resources that may be locked up in thousands of reels of tape.

In most environments, mini time-sharing systems complement the in-house batch system without competing with it. Those tasks that tend to bog down a batch system are generally suited for mini time-sharing. In addition, a high percentage of programs best suited for a batch system can be developed and debugged on a mini time-sharing system.

Data transfer between the systems can extend the local batch system's facilities to remote locations. Thus, data and programs can be entered into a mini time-sharing system from remote locations and transferred locally by magnetic tape to the batch system.

The data resulting from the batch execution can then be stored on the time-share system and remotely accessed by the requester. The net result is that the batch facility is free from minisecond jobs and can be used most of the time for production runs.

How to Choose

A more difficult task than justifying an in-house mini time-sharing system is evaluating systems on the market. The three most commonly available hardware types are:

- Single processor, single access
- Dual processor, single access: Typically one processor is dedicated to communications while the second processor acts as the monitor control and performs compilations and executions
- Dual processor, dual access: Typically one processor handles communications and executive monitoring control while the second processor is dedicated to program executions and compilations. Both processors have access to the data base.

The single-processor, single-access system has only limited capabilities in any aspect of time

(Continued on Page S/7)

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Though Intricate, Microprogramming Can Save Money

By D.E.W. Archdale
Special to Computerworld

Usable microprogramming techniques, are in the midst of far-reaching technological breakthroughs.

The availability of LSI Read-Only-Memories (ROM), and the combination of MOS and bi-polar main memories, are effecting a significant improvement in cost/performance ratio while at the same time setting the stage for even more powerful product and system development techniques.

Microprogramming is a technique that implements each user level instruction or special function by means of a micro-coded routine in read-only-memory. Until very recently, the use of micro-coded ROMs required a trade-off in user-level speed to get a truly third generation architecture and instruction set.

Now, from the customer point of view, the improvements in LSI cost/performance are bringing in sight the long-awaited day of "do-it-yourself" microprogramming. Presently being introduced are "once programmable" ROMs (or Proms). Normal "masked" ROM chips will he pin and performance replaceable by Prom chips. Knowledgeable customers can write their own micro-code routines into blank Prom chips, then insert them into the processor with a minimal amount of hardware modification.

The next step in this technological evolution is being readied for introduction in late 1971 or early 1972: read/write bi-polar memory, with cycle times of around 100 nsec. While the bi-polar memory has an obvious "scratch pad" function, it is still too expensive at present for main memory. But note that at 100 nsec, the bi-polar read/write memory is approaching the speed of the ROM, or "control store," where micro-coded routines are stored.

By using read/write bi-polar memory in place of the ROM (or as an extension to it), we reach the mind-boggling concept of a high performance dynamic control store (DCS). Several manufacturers are working in this direction.

With DCS, design alternatives can be microprogrammed and executed at close to hardware speeds. No actual hardware design cycle is required, and micro-routines can be debugged and modified on the spot by the user, operating without benefit of manufacturer assistance.

For data communications, a typical design problem is how to achieve maximum throughput for a given mix of terminals, line types, speeds and protocols. The coming availability of the DCS provides two design approaches.

First, various hardware designs can be tested in microprogrammed form, from which the best design can be selected for the given mix. The second, and even more powerful approach, is to offer a completely adaptive configuration in which micro-coded routines, optimized for line speed and terminal type, are kept in-DCS to be activated in real time.

The use of higher level languages in minicomputers has been somewhat limited since these languages generally produce efficient machine operations only on systems with floating point hardware or extensive multi-byte precision hardware. With a high speed DCS, there are several approaches now being evaluated to enhance speed of execution and help reduce the present dependance on assembly level coding.

First, special routines can be micro-coded to extend the standard instruction set of the machine to effectively support the particular compiler. This technique can produce dramatic improvements in speed of execution of object programs.

Looking beyond this, however, it is apparent that if microprogramming can largely eliminate the inefficiencies of code generated by higher level languages, why not go the point of a completely interpretive machine that never sees assembly language? This has been done to some extent on large machines but, to date, not at all on a production minicomputer.

In fully expanded form, micro-coded functions could be rolled in and out of DCS depending on the source language entered into the system.

D.E.W. Archdale is director of marketing operations at Interdata.

Mini Time-Sharing May Be Wise Choice

(Continued from Page S/6)

sharing. It handles small programs effectively when the number of simultaneous users and the data base are limited.

The dual-processor, single-access system delegates the communications tasks to one processor, freeing the second to control management and job execution. It tends to be a single-language processor system.

The dual-processor, dual-access system handles many users, runs large programs and performs many more functions than the single-access system. It provides multi-language capability, as one processor is effectively dedicated to job processing.

A system's architectural design should be evaluated to determine its expansion capabilities. Initial consideration should be given to the feasibility of expanding the number of its simultaneous users. The size of its data base, and its functional capabilities that include:

- O System-supported terminals
- O Ability to save binary files
- O Ability to access other users' programs
- O Ability to place programs in a common library
- O File security for individual programs
- O Available user core memory for program execution
- O System command repertoire
- O Available compilers and assemblers
- O Size of data base
- O File editing and manipulation
- O Ability to transfer data to and from systems
- O System record keeping
- O Number of unique users the system recognizes
- O System backup and reliability.

In making the final system selections some inherent limitations of the minicomputer should be recognized. For example, its core size is more limited and its execution times are slower than those of larger systems. Thus, any attempt to justify replacing all outside services with an in-house system might be ill-considered.

In the final analysis, mini time-sharing is a cheap way to provide computer power to people. It not only makes people more productive, it automatically educates them in computer science. The end result is more effective use of the human and material resources of an organization.

G. Refer is with Honeywell Information Sciences in Wellesley Hills, Mass.

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Good Programmer a Must

Minis for Business Possible, But Watch for Pitfalls

By Donald Yamyt
Special to Computerworld

Small commercial computers don't differ from minicomputers because of technical reasons, but solely because of applications orientation and support. The small computer offers better service and documentation, and business oriented software.

The minicomputer, though, can offer flexibility and power beyond the range of the small computer, and can end up considerably cheaper.

Minis that have business application software are still scarce, but they excell in areas calling for special software and communications capabilities. The differences between the two types of machines are growing smaller constantly, as well.

So here are some considerations for the adventurous businessman planning his first minicomputer system.

Consultants

Consultants can help in aspects of setting up a computer installation, particularly when companies lack experienced employees. Since minicomputer projects have stringent budgetary limitations, hiring specialists as full-time employees is often impossible.

The consultant can give valuable guidance in formulating system objectives, from which all other considerations should follow and against which all decisions should be measured.

They are based upon the business needs and financial considerations required to achieve long-term company objectives. He is in a position to consider all aspects of automation in formulating the objectives.

The consultant can also provide long-range planning, help in selecting equipment, and assist with software planning.

Programming Languages

Initially, minicomputer users coded programs entirely in assembly language. Higher level languages, however, have steadily gained in importance. Today, virtually every major minicomputer has a Fortran compiler and a version of the Basic language.

The day will probably never come when there is no need for assembly language code for such routines as device drivers, but higher level languages have been successfully used in many situations.

The usual software for commercial computers includes a report generator program and/or a stripped down version of the Cobol language. Fortran is not now generally available on them.

Because of its almost universal availability, of Fortran and its adequacy for most tasks, it is probably the best language to use. It enables programs to be written in less time with a degree of machine independence that can never be achieved with assembly language.

Some advice for those not knowledgeable about machine independence: While few, if any, programs written in Fortran will run unchanged on two different computers and do exactly the same thing, the effort involved in converting them can be quite small, if this objective is kept in mind from the beginning.

A strong preference can be justified for programming in Fortran for any minicomputer application, including commercial applications programs. Fortran programmers are easy to find and their number grows every day. Also, all minis and almost all larger computers have a Fortran compiler today, giving them maximum operational flexibility.

The Right Employees

A tricky aspect of setting up a minicomputer (or small computer) installation is getting the right employees. Since decisions about the computer system must be made at times, someone in authority must be knowledgeable.

This may require hiring a fairly high-level person, who should be a computer generalist with equal strength in both hardware and software. He should be able to perform or supervise the software development. He should also know the strengths and weaknesses of the computer equipment and be able to select hardware.

Correct selection of devices is an art with long-term implications including a profound influence on software. Such a broad background is seldom found (or required) in DP personnel.

The remarkable contrast between the environments of data processing and minicomputer installations must be carefully considered when recruiting personnel. The "beehive" environment of the former, with its elaborate hierarchy of workers, is unsuitable to a very different type of person than is the jack-of-all-trades environment of the minicomputer installation, where the programmer may perform all functions from operator to system manager.

Motivational factors, above and beyond professional qualifications should strongly influence the choice of individuals for each type of installation.

Programmer Productivity

Easi of operation is a primary concern for the small staff of the mini installation. It can be increased markedly by means of proper software design. For example, look at the superb job done by time-sharing software, where the conversational interactive approach contributes greatly to solving the problem of man-computer communication. The situation with regard to operational ease has not yet been solved for minis but is improving steadily.

The aim of an operating system for a large centralized computer is to make best use of the computer's resources. Jobs are scheduled at the computer's convenience and there is usually a delay between the time a programmer submits a job and the time he gets his run back.

The minicomputer on the other hand, is often devoted to a particular function. The objective here is to finish the software and get the computer working on the problem as soon as possible. Since the computer is ready whenever the programmer is, the constraint is the programmer's speed in performing his tasks. The right software can do much to optimize programmer productivity.

Future

In the next few years minicomputers will appear in commercial applications requiring special-purpose systems. However, head-on competition between the mini and the small computer is unlikely.

Mini time-sharing services already compete for the same market and, in some ways offer much more flexibility. On the other hand, the future success of minis will be based upon its communications and real time processing capabilities.

The intelligent terminal utilizing a mini with graphic display devices and connected to supercomputers is a natural extension of time sharing. This has the added advantage of dividing the work load between the terminal and the central computer.

To further offload the central computer, front end processors using minis will perform communications processing to link the terminal with the central computer.

D. Yamyt is with Honeywell Information Sciences in Framingham, Mass.

Getting Proper Hardware Means Shopping

In general, what is taken for granted in purchasing or leasing a large computer cannot be taken for granted for the mini. Comparison shopping is essential since you will find several suppliers of the equipment you seek.

The uninitiated should avoid anything except the standard equipment listed in the manufacturer's price book. Many well known devices are not commonly used with minis. OCR and microfilm equipment are two. If you need these kinds of devices, use a local service bureau that has extensive experience and can probably do the job at a reasonable cost. There will be plenty of time to use them after they have been fully debugged by others.

Avoid assembly language programming. The cost of program development can be greatly reduced by using Fortran or another high-level language. The cost of programmer training is less, there are more programmers in the work pool to draw upon, the programmer becomes proficient faster, the code is easier for a second programmer to read and understand. Programs can be transfered to another computer with much less effort and the programs will be implemented much quicker.

Look for the good documentation many manufacturers offer. Because of the relatively low system cost, the manufacturer supplies proportately less post-sale support, so do not expect the same support that goes with million-dollar systems.

Try to get the name and phone numbers of those responsible for post sales support. They can be helpful, especially if you find errors in the standard software, or even think there are.

Good documentation helps bridge the support gap.

When hardware failure occurs, fast field service is needed to get the system up and running quickly. Find out the rates, which depend upon the time of day the repairs are made.

Find out how fast the field service organization reacts. Look into a service contract. Know where the service man is located and how far he will have to travel.

Minicomputer training is generally offered by the manufacturer, but by no one else. Have several employees take the course so as not to become dependent upon one individual.

The most important things they will learn are how to write computer programs, how the software works, and how to operate the equipment. (The maintenance course is not as important as the programming one if you do not expect to do your own repairs.)

There is a growing pool of programmers already familiar with minis so trained personnel can sometimes be hired thorugh ads or agencies.

Plan for backup in case of the worst imaginable emergency. This includes maintaining duplicate data files and having access to another computer.

Do not dispose of raw data until you are sure it will not be needed again. Always be able to back up and repeat the last step.

Find a service bureau that leases computer time on the same model mini or a time-sharing service that uses the same mini. They provide emergency backup and allow you to begin software development even before receiving your own computer.

Be sure you know the procedures for transfering programs from your computer to the backup and conversely. With proper planning the transfer can be easy.

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But How Do You Pick One?

Modern Operating Systems Ride Herd on Many Chores

By John D. Madden
Special to Computerworld

Today's typical minicomputer real time operating system provides the services necessary to coordinate complex mixes of resident and non-resident foreground programs along with a background batch processing system.

It acts as the mediator between independent tasks competing for system resources. It also provides a convenient interface to the computer's I/O system and supports parallel operation of programs and I/O transfers.

The user of a generalized real time operating system pays penalties when compared with the user of a well designed and implemented system that was tailored to the particular application. The penalties are measured in storage requirement and interrupt response time.

With the speeds of minicomputers increasing and the costs of both main memory and bulk memory decreasing, however, these penalties are of diminishing significance.

The advantages of employing a generalized operating system are fairly clear:

- Programming is less complex
- There is less total programming and debugging to do
- There is less total documentation to do
- Some standardization from application to application is imposed
- In most cases, programming can be done in a higher level language.

Almost all of the leading minicomputer manufacturers offer one or more real time operating systems. There is a marked similarity between these systems in concept, but they do differ in detail. A prospective applier should weigh carefully the mix of detailed features offered in a system against his application before selecting the system. Major areas which he should consider are:

How is CPU time allocated? How are priorities set? How are they changed? What is the relationship between hardware and software priorities? Can lower priority tasks impact higher priority tasks?

What options are available for initiating tasks? Can tasks be initiated after a specified delay? After a fixed time of day? After a particular interrupt? Repetitively at a constant time interval?

Which procedures are used to place tasks in waiting or idle state and which to return a task from wait state? Systems vary widely in this area. Some procedures will be more convenient than others in particular situations.

How is memory managed? Is it possible to debug user programs in the background under memory protection? Can non-resident user programs be relocated in main memory? Is static or dynamic partitioning used? Is a common buffer pool provided? Is space allocation on bulk memory fixed at system generation time, by the operator, or by user programs through the operating system?

What input/output monitor services are provided? How is I/O completion detected? What kind of I/O formatting is provided? What, if any, file management capability is provided? Is an indexed access method available? How are I/O requests queued? Is exclusive use of I/O devices or bulk files allowed? How is the correspondence between logical and physical I/O devices established.

What facilities for detecting and correcting errors are provide? Is there parity checking in main memory and I/O transfers? Are "dead man timers" used to detect abnormal delays? Are failing I/O transfers retried? Can alternate I/O devices be assigned readily? Are program error diagnostics adequate?

Does the background monitor have a full set of functions? Are all control commands necessary to direct the system provided? is it convenient to run batch-processing jobs on the system?

Is the operator communications package adequate? Can those functions requiring immediate operator intervention be accomplished conveniently?

What is the extent of the higher level language facility provided?

Is system documentation adequate? Is the documentation clear? Is the documentation complete enough so that the applier's system programmers can modify the system?

Is the system generation process difficult? Is there a system generation prompter? How many parameters are set? To what extent does the user need to know the system algorithms? is there a choice of system algorithms?

The trends in real time operating systems stem from two sources. One set attempts to fix the shortcomings in present day systems. For example:

- Systems are being made more modular so that just those features required need be incorporated into the operating system to be used
- Systems are being made more flexible so that fewer parameters need be set st system generation time
- The higher level language facilities of these systems are being improved
- User file handling and user file generation facilities of these systems are being improved to cure a major weakness of existing systems, as well.

(Continued on Page S/11)

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Many Criteria Important in Minicomputer Selection

By Lawrence Seligman
Special to Computerworld

All of the minicomputers introduced in the past two years by major manufacturers are 16-bit word length computers with multiple accumulators. They vary most in speed, instruction set, I/O capability, standard peripheral availability, software and, ultimately, system performance.

The prospective minicomputer user is faced with the formidable task of evaluating these major parameters of system performance against his requirements.

The user first looks at the execution speed for typical classes of instructions such as arithmetic and logic. He then examines other aspects of the instruction set:

- How much can a single instruction perform in that specified execution time?
- How many instructions does it take to do the types of tasks he has in mind?
- Are instructions executed in a single cycle, or does it take several cycles for an instruction?
- How easy is it to program using the instruction set?
- What is its direct and indirect addressing capability?

The power of an instruction set has, in the past, been determined by the cost of the hardware required to implement it. In order to keep prices of minicomputers low, the instruction sets provided were always minimal.

With MSI and LSI integrated circuits, it is possible to provide more powerful instruction sets within the minicomputer context. The limitation today is a question of how one would divide up a 16-bit word to make the most powerful instruction set possible.

The alternative technique of using multiple memory words for an instruction has been rejected by most minicomputer manufacturers as the amount of memory required to store programs greatly increases.

A typical modern instruction set provides for multiple accumulators and index registers, several addressing modes, and a very powerful class of register-to-register arithmetic and logical instructions. Often multiple steps can be performed within a single instruction.

I/O Important

Next, the user will want to evaluate the I/O capabilities of the machines he is considering. Is the I/O facility fast enough and flexible enough for his requirements? How easy or difficult is the interface task?

The architecture of the modern 16-bit minicomputer makes it easier to interface special purpose hardware than it was with earlier small computer designs. Not only is the circuitry itself better, but direct memory access data channels are faster. Less buffering in the peripheral devices is required.

Multi-level priority systems are more common in newer machines making the old single-level program interrupt system obsolete.

Users must also evaluate the ease of interface as one of the most important criteria in minicomputer selection if they will be attaching special devices of their own design.

Complex interfacing schemes will require the talents of engineers with a great deal of expertise in the mini's interface logic, expertise that develops only after many projects.

In evaluating the difficulty of interfacing to a particular computer, a good place to begin is a careful examination of the manufacturer's descriptions of his typical interfaces. A good interface is simple in the sense that the I/O bus signal lines have well defined, independent meanings and no complex sequencing of signals is required. The more parallel and direct the interface is, the easier it will be for the user to build and debug his logic.

Another rule of thumb test is, if the mini is indeed easily interfaced, then the manufacturer should be able to make available a large number of inexpensive interfaces to standard peripherals. If the

(Continued on Page S/13)

User Has Wide Choice Of Processing Power

(Continued from Page S/2)

tie the functions together to solve a problem. This often results in stilted, unnatural steps.

The minicomputer is easily upgraded into a powerful system because it has many peripheral devices available to it. Its storage capacity can be increased greatly by memory-extension peripherals as in the mainframe.

One of the greatest strengths of a minicomputer is its flexibility; since it can be altered by merely reading in a new program, radical changes in minicomputer functions are reasonably easy to do and are common in many facilities that use minicomputers. Minicomputers are often incorporated into instruments and systems, but when they are not being used for their primary function, they are often reprogrammed to do calculations or other different jobs.

A minicomputer has limitations too. There are highly complex jobs that it cannot handle, such as mathematical simulations or computations that require a very large data base. A large computer system that can hold a sophisticated program or manipulate the data base is needed for these.

While some facilities own their large computer systems outright, there are relatively few applications that would require the full attention of an entire large computer system. So large computer systems usually have multiple users, who use remote terminals connected to the central computer via common carrier communications lines.

Enter the "intelligent terminal." The intelligent terminal is a device that has all the normal terminal characteristics of input and output, but in addition, has automatic features that increase some of its capabilities. An intelligent terminal normally uses a minicomputer as a controller, and has some form of data storage. It is capable of formatting and editing, and it stores data and sends it at a fast rate, cutting down communication time from terminal to computer.

Obviously, none of the alternatives is clearly superior to the other in all cases. Equipment buyers must consider the level, scope, and type of computational problem they are trying to solve when weighing the advantages and disadvantages of computer and calculator system alternatives.

E.L. Mariano is manager of product planning market development for Digital Equipment Corp. in Maynard, Mass.

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Mini or Intelligent Terminal: Is There a Choice?

By Jan Orris
Special to Computerworld

The line between a minicomputer and a smart terminal is not all that wide. We assume anything that can utilize an assembler and/or compiler and is programmable by a language processor is a minicomputer per se and not a smart terminal. A smart terminal generally consists of some sort of a memory system (buffer) and a controller that can usually be programmed, perhaps on a host computer, only with great difficulty and extra costs.

The price of these devices is very close to the price of a minicomputer. For example, a minicomputer may sell for $5,500, while a typical "do nothing" smart terminal sells for about $2,500 – an obvious if misleading difference of $3,000. However, by the time peripheral equipment such as a card reader and line printer is added, the smart terminal price has increased at least $1,000 because memory has to be added to handle the peripheral equipment. The $5,500 price of the minicomputer already covers 4K of memory. The $3,000 difference now represents only about 10% of the system cost and the difference in flexibility and off-line computing power is enormous.

When a customer is interested only in talking to a communications line, card reader, and line printer, a smart terminal may be able to do the job. "

J. Orris is director of product management for Varian Data Machines in Irvine, Calif.

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Minicomputer Business Has Own Jargon

(Continued from Page S/2)

external, such as an I/O device signaling that it has completed an operation or needs to be read. The number of *external interrupt levels* is a guage of a mini's suitability for some applications. It equals the number of peripherals whose interrupt signals can be identified and handled.

One and two pass assemblers are just like the ones on the big computers. The one-pass program changes mnemonic instructions and symbolic addresses to machine language in one scan of the program. It's fast, but the sizes of storage allocations have to be specified at the beginning of the program. The two pass assembler requires two scans. It builds a symbol table on the first scan, and generates code on the second, a slower but more powerful technique. A *macro assembler* allows the programmer to specify a sequence of machine instructions with one macro instruction in the source program.

Compilers allow programmers to use higher level languages, such as Fortran and Basic. This may not be necessary to some users who need machine efficiency enough to write in machine language. The compilers also take up a fair amount of storage, so a larger memory may be needed.

Current minicomputer *operating systems* run along the lines of real-time monitors, handling scheduling, loading, I/O, interrupts, and communications. There are some multiprogramming and time-sharing operating systems, though.

Real-Time Operating System Extracts the Most From a Mini

(Continued from Page S/10)

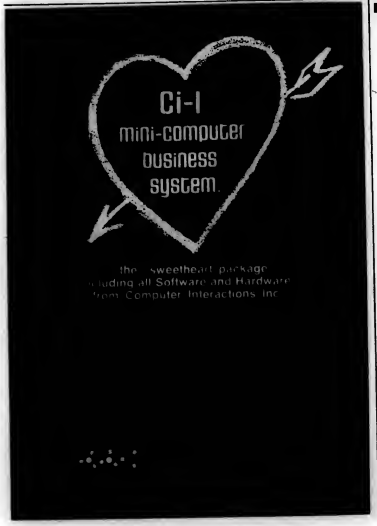
One glaring shortcoming of present day systems is the absence information or instrumentation that would enable prediction of the performance of the hardware/software system. This is a facility that is badly needed.

The other set of trends in real time operating systems is a response to new hardware developments and decreasing hardware costs. It has been predicted that some of the important operating system functions will be implemented in firmware. This will simplify the software of the system and will result in substantial performance improvement in the hardware/firmware/software system.

Memory mapping and interrupt response algorithms are prime candidates for firmware implementation.

Clearly, the minicomputer industry feels that the bulk of real time applications will employ generalized real time operating systems – that for a company to compete it must supply a good operating system as well as good hardware. This fact bodes well for rapid development of the real time segment of the computer field.

J.D. Madden is vice-president of Computa, Inc., which has just completed an analysis of available real time operating systems.



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Problem-Solving Capability

Midget Machines Play Role in Data Communications

By George E. Friend
Special to Computerworld

The problems caused by the data communications explosion will probably not be solved entirely by the minicomputer, but no other component offers as much problem-solving capability in the four major areas of communications applications: remote terminal controller, front end for a large computer, data concentrator, and store-and-forward/message switcher. It is in these four areas that minis play their major role in data communications.

The greatest area of growth for minis in data communications is as remote terminal controllers, where the computer ties together input and output devices -- usually a card reader and line printer -- and the mechanism that connects the terminal to telephone lines and the host computer. The mini has two functions in this role: It routes data within the system, and it acts as a quantity and speed buffer between the host computer and the remote devices.

This means that in, say, a remote batch terminal, data are fed through a card reader, and are sent either to the terminal's output medium or to telephone lines to the host computer. A characteristic of remote terminal controllers is that they do not store data -- the data are always sent someplace. After the host computer processes the data and sends them back, the mini buffers the information so it can be handled by the terminal's output medium.

Future Bright

The future of minis as remote terminal controllers is bright for both end users and computer manufacturers. From the end user's point of view, cost reductions and increased price/performance capability are certain, if only because more small computer makers are making systems -- hardware and software -- for remote terminal control than ever before. Users no longer have to go to the manufacturers of the host computers to get their remote terminals; they may be better off, financially and technically, selecting their remote terminals from independent sources.

The remote terminal controller's alter ego is the front end processor, which receives the data the remote terminal sends, collects its, and distributes it within the central computer system. Minicomputers have helped the pre-processor evolve from a hardwired, fixed-capability device into a flexible tool that has increased the efficiency of the central computer.

Front end preprocessors became widely used when time-sharing services realized that much of their mainframe was tied up in floating point hardware, and using this capability to handle communications was wasting computer power. The hardwired pre-processor, and later the minicomputer-based front end system, were installed to handle such low and medium speed terminals as teletypewriters and CRTs as well as the high speed remote terminal controllers and remote data concentrators.

A mini-based data concentrator acts like a funnel; it can take a number of low-speed data streams, put them into one higher-speed data stream, and send it to a host computer. Like the remote terminal controller, there is no long-term storage of data; a data concentrator seldom stores anything longer than a few seconds.

The beauty of using minis in these applications is that their jobs can be expanded easily and inexpensively. This means the same machine that once served the relatively dedicated function of speeding up several data streams can also decide where to send the data, and whether or not the data is valid, and it can interact in a basic way with the user to detect and correct errors. Also, if more than one kind of large computer is being used, they may have incompatible codes. In this case the mini-based data concentrator also can be used as a code converter.

The final major role that minicomputers play in data communications is as processors in store-and-forward/message switching systems. This is a smaller, yet significant segment of the data communications market, and one that is extremely specialized. Functionally, there is a little difference between a store-and-forward/message switching system and a data concentrator, except that in the former, the message can be stored in the computer or its peripherals for some time.

The need for these systems is growing for two reasons: companies are sending more traffic over common carriers, and mini-based systems are beginning to replace and upgrade older and less reliable relay-based switching systems.

George E. Friend is in the Communications Marketing Group at Digital Equipment Corp.

Going to Buy a Mini? Compare Features

(Continued from Page S/11)

cost of standard peripherals is high, then the interfacing is probably quite complex.

A user will also need to evaluate the range and quality of the software of each manufacturer. How powerful is the software he will need for his immediate problem and will other types of software be available for future requirements.

Additionally, the capability and breadth of a manufacturer's system software is also a good rough measure of machine programmability.

Next, the customer will want to evaluate the breadth of product line available from the manufacturer:

- Are there a variety of program compatible models on which he can run the same software?
- Does the line of peripheals include the items he needs to configure a system?
- Are the peripherals compatible with other computer models in the line, facilitating a later upgrading to a faster or more powerful mainframe?

Finally, of course, any minicomputer evaluation will include considerations such as the service and support capability of the manufacturer, and the proven reliability of each manufacturer's system in the field.

L. Seligman is a design engineer for Data General Corp. in Southboro, Mass.

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COMPUTERWORLD

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August 25, 1971

CI Notes

Telex to Market ISS Drive

TULSA, Okla. – The Telex Corp. will actively commence marketing the ISS manufactured double-density disk storage device known as the 5625 and 5650 in the North American IBM and-user market.

The announcement follows the issuance by the District Court here of a temporary injunction against Information Storage Systems, Inc., and its parent corporation, Itel Corp., prohibiting them from marketing the double-density device in that marketplace.

ECD Cuts Memory Prices

TROY, Mich. – Energy Conversion Devices, Inc. has reduced prices up to 50% on its RM-256, a 256-bit Read-Mostly Memory. The new prices are now $60 each for 1 to 24 units, $45 each for 25 to 199, and $38 each in quantities of 200 or more. ECD attributed the price cut to increased manufacturing efficiency and lower production costs.

$3 Million Service Pact Signed

MILWAUKEE, Wis. – Johnson Service Co. and Modular Computer Systems, Inc., have inked a $3 million agreement whereby Johnson will purchase several hundred of Modular's real-time computers and related products – valued at a minimum of $3-million – while Modular will use Johnson's international field service organization.

Modular will use Johnson's service organization of 180 digital systems specialists in 114 branch offices in the U.S. and Canada and 38 offices abroad.

Supershorts

Cogar Corp. has made the first shipment to International Computers, Ltd. (ICL) of Cogar's MOS/LSI main memory system. The system will be used in ICL's Model 1904S computer.

– – –

Computer Communications, Inc. has signed a new third party leasing agreement, under which the third party will purchase up to $1.5 million of CCI equipment for lease to CCI customers. In connection with the agreement, the third party was granted five-year warrants to purchase 35,000 shares of CCI common stock at current fair market value.

– – –

The Memory Products Division of Fabri-Tek, Inc., has received an order to produce additional core memory stacks for the Varian Data Machines 620/f computer system. This Varian order, in excess of $100,000, is an additional release against a master contract on the order of $750,000.

– – –

ITT Data Equipment and Systems Division has announced that effective immediately all data communications lease prices will be guaranteed for one full year from the date of acceptance. In addition, ITT will provide a minimum of 90 days prior notification of any price change after the first full year.

Assessing the Effects

Attitudes Mixed on New Nixon Plan

By E. Drake Lundell, Jr.
CW Computer Industry Editor

WASHINGTON, D.C. – The computer industry spent the week after President Nixon's announcement of a new economic game plan trying to sort out the effects – with mixed results.

While the large mainframe manufacturers were trying to decide whether or not the price freeze would force them to roll back recently announced price increases (see story page 1), most other manufacturers saw the greatest impact of the announcement in the areas of foreign trade and the investment tax credit.

Under the new rules, firms that manufacture parts and components overseas will have to pay a 10% surcharge on the price of foreign materials in the systems imported into the U.S. This surcharge, according to the Office of Emergency Preparedness, could be passed on to OEMs or end-users in the form of increased prices.

Some firms that manufacture core stack and memories overseas estimate that the announcement could add over 20% to the price of manufacturing units in the Far East, predicting that a 10% to 12% devaluation of the dollar would be added to the surcharge.

Some of this, one source said, would have to be passed on to the ultimate OEM or end user.

"The announcement will have no effect on our prices," according to Jeffrey Donohue of Consolidated Computer International, a subsidiary of a Canadian corporation. He said that the surcharge would only be applied to the cost of Canadian materials in their Key-Edit systems and said that the Canadian portion was minimal. Consolidated buys most of the components for the system in the U.S.

Unofficial sources at the Department of Commerce said the surcharge should have little or no effect on the imports of computer equipment, even though it could account for a drop of as much as 6% in overall business machines imports.

The officials noted most imports for the computer business were in the area of parts manufactured by divisions of American companies overseas. Those parts are needed here for assembly, surcharge or not, they noted.

Even though they were not pushing the point, several minicomputer manufacturers indicated that the investment tax credit could aid them if business picks up in the machine tool industry, which has been more depressed than the rest of the country.

"While we don't see the machine tool industry picking up right away because of the credits," one said, "any gains in that area would help us since minicomputers are becoming a larger and larger part of overall machine tool and process control systems."

In the soft side of the business – software and services – the announcement will only effect the industry to the extent that it spurs the economy.

The service bureau industry will only be boosted to the extent that the announcement helps the overall economy, according to Bernard Goldstein, president of the Association of Data Processing Service organizations.

DEC Reinforces OEM Commitment With New Minis, Discount Plan

MAYNARD, Mass. – In a move planned to "reinforce" its "leadership position" in the OEM market, Digital Equipment Corp. has introduced two new minis and announced a unified discount policy.

The two new systems, called the PDP-8/M and the PDP-11/05, are priced at $2,362, and $3,069, respectively, in quantities of 100. Base prices for the systems are $3,690 and $4,795.

Under the new unified discount policy, customers will be allowed to combine their purchases of the new computers for quantity discounts. Therefore the purchase of any combination of 100 units entitles the customer to up to a 36% reduction in the base price of both machines.

The low prices of the new systems are the result of advances in manufacturing technology, especially the implementation of automated techniques in testing and assembly operations, according to Kenneth H. Olsen, DEC president.

Systems Detailed

The PDP-8/M – now DEC's lowest priced computer on the market – is a 12 bit machine that features a 1.2 µsec cycle time and 2.6 µsec add time. It is compatible with the other members of the PDP-8 line.

For the base price the system comes equipped with 4K (words) of memory, which can be expanded to 16K and/or the control of up to 14 peripherals within the system chasis. With an expanded chasis, up to 32K of core memory and/or the control of up to 25 peripherals can be handled by the system.

The PDP-11/05 – the lowest priced system in the PDP-11 line – is a 16 bit machine with 4K memory in the basic configuration. The memory, which features a 1.2 µsec cycle time, is expandable to 32K.

It features serial communication line interface, Direct Memory Access, and power fail and restart.

The PDP-11/05 also features more than 400 hard-wired instructions designed to operate in word, byte, or bit mode. The new unit also includes a temporary data storage unit or hardware stack. The hardware stack is used automatically by program interrupts, subroutine calls, and trap instructions for temporary data storage and for passing arguments to traps and routines.

Both of the new systems use the DEC UniBus, a bidirectional data transfer path interconnecting the core memory, CPU, and peripheral devices. They will be manufactured in facilities in Westminster, Mass., San Germain, Puerto Rico; and Galway, Ireland.

First deliveries for the PDP-11/05 are scheduled for spring 1972, while the PDP-8/M is slated for delivery this December.

$2 Billion Mark Seen for Services Industry This Year; $5 Billion by 1975, IDC Says

By Alan Drattell
Of the CW Staff

NEW YORK – By almost any yardstick the computer services industry is a big one, and it's growing fast, according to a survey prepared by International Data Corp. in conjunction with the Association of Data Processing Service Organizations.

Its 243,350 customers poured in revenues of $1.98 billion in 1970, income can be expected to reach $2.45 billion this year and projections show that total will nearly double to $5.01 billion in 1975.

"The numbers are coming in," said Bernard Goldstein, Adapso's president and head of his own company, United Data Centers, Inc., in disclosing the results of the study here last week.

The figures do not include services provided by such organizations as banks, which if counted, according to Goldstein, would balloon the 1971 figure toward $3 billion.

Batch data processing accounted for the bulk of revenues in the industry – 47% last year, 45% this year and 36% projected for 1975. Rising are on-line processing (from 15% in 1970 to 26% in 1975) and other services such as key-punch, OCR and COM (from 10% last year to 16% four years from now).

There were 1,050 firms in the industry employing 85,400 people in 1970. The total number of companies, however, will fall to 1,000 this year and rise again to 1,300 by 1975. "Average employment is up actually by one person per company this year," Goldstein said. The average company in the industry employed 81 people at year-end 1970.

The economic recession cut hard into the profits of industry firms, with average earnings falling from 6.5% in 1968 to 2.9% in 1969 to a loss of 8.3% last year. The larger firms, the survey showed, tended to have the worst profit picture and higher profit performance came from those operations that tended to be specialized.

As a user of equipment, the computer services industry provides IBM with significantly less than a majority of the market. IBM's share dropped from 39% in 1969 to 33% in 1970. Honeywell, a strong second in 1969 with 13% slumped to 8% last year, while Digital Equipment Corp. garnered 10% in 1970.

GE Plans to Industridize Interdata Mini for Control

WEST LYNN, Mass. – General Electric, which got out of all mainframe business except process control last year, has now turned to another manufacturer for one of its process control units.

GE will manufacturer the system, under a license from Interdata, Inc., developer of the unit. The systems will be an industrialized version of the Interdata Model 7 and will be called the GE-PAC 30-CS.

The unit will be manufactured at a GE plant in Richmond, Va., where it will be made to meet "the rigorous temperature, vibration and humidity requirements found in the manufacturing environment," GE spokesmen said.

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General Dynamics Convair to Develop Common Software for Space Launches

SAN DIEGO, Calif. – General Dynamics has been awarded a $1.75 million contract by the Air Force Space and Missile Systems Organization to develop a system to overcome the language barrier between different computers and permit pooling of computerized space launch vehicle guidance data.

Under the two-year contract, the firm's Convair aerospace division and two subcontractor firms will design and implement a Flexible Guidance Software System (FGSS) Configurator to manage data from aerospace firms utilizing different computer systems in the design, development and validation of launch vehicle guidance software.

The two subcontractor firms are System Development Corp., which will assist with computer language compilations, and Computer Sciences Corp., which will assist with software configuration control, computer time-sharing techniques and quality assurance.

Launch vehicle trajectory programs previously developed on one company's computer usually could not be transferred to another firm's computer for use without costly adaption processes.

Through the use of the FGSS Configurator to be developed, aerospace engineers in different cities aim to simultaneously gather data, develop guidance trajectory models, and prepare and check out flight guidance computer programs with computer compatibility being provided automatically.

As part of the requirements under the Configurator contract, Convair Aerospace and the subcontractor firms will develop a Space Program Language for use in a host computer that will receive and output data for using agencies.

The software system to be developed will include control programs to provide desired system response to user commands, processor programs to provide for missile analysis and development of flight programs and multi-mission trajectory program libraries that users may use to retrieve existing trajectory programs or add new ones.

The trajectory program libraries to be established as part of the proposed Flexible Guidance Software System will contain a reservoir of predeveloped data on different types of launch vehicles and trajectories that can minimize the need for "mission peculiar" software development.

Probst Appointed Univac President; McDonald Moves to Sperry Post

NEW YORK – Sperry Rand Corp. has named Gerald G. Probst as president of the Univac division.

Probst, formerly an executive vice-president of Univac, succeeds Robert E. McDonald, who will assume full-time his post as executive vice-president of Sperry Rand. McDonald served as president of Univac since 1966 has has also been an executive vice-president of Sperry since 1968.

Probst joined Univac in 1961 as director of advanced development and he later served as vice-president, engineering, and vice-president and general manager of Univac's defense systems division. He became

Executive Corner

vice-president and general manager of the federal systems division in 1967 and the following year vice-president and general manager of Univac's data processing division. In 1970, in a major organizational restructuring, Probst was appointed an executive vice president of Univac.

Other Moves

■ Dean R. McKay has been elected a senior vice-president of IBM. He will continue as a member of the management committee, a group of senior executives who assist in the general management of the business.

■ Franklin P. Johnson, chairman of the board of Boole & Babbage Inc., has been elected president. Vice-president Bruce T. Coleman has been promoted to vice-president and general manager.

■ Dr. Franklin P. Dixon has been named vice-president, product management, systems at Singer Co.'s Friden division. Patrick C. Byrne has been appointed to the new position of vice-president, product management, modular data transaction system.

■ James P. Boyle has been named marketing vice-president for RCA's magnetic products division.

■ BASF Systems Inc. has elected Franz J. Leibenfrost president and Werner Baitz executive vice-president.

■ Dohn Johnson has been promoted to vice-president, international finance of Computer Machinery Corp.

■ G. Charles Cole has been named president and chief executive officer of General Computing Corp.

■ Lawrence R. Knowles has been appointed vice-president, marketing, and E. Arnold Menn Jr., director of marketing of Memorex Corp. information media group.

■ Samuel Nissim has been elected chairman of the board of Electronic Arrays, Inc., and Moia Gerson has been made president.

■ George A. Howard has been appointed group vice-president in charge of product development and production for Edutronics Systems International, Inc.

■ Compu-time has appointed Richard A. Cloughley executive vice-president, planning and development, and Charles R. McInnes vice-president, systems software development.

MISSISSIPPI STATE CENTRAL DATA PROCESSING AUTHORITY

Advertisement for Bids

Sealed proposals will be received by the State Central Data Processing Authority, 508 Robert E. Lee Building, Jackson, Mississippi 39202, up until 2:00 p.m., Monday, September 6, 1971, for the following data processing equipment:

Request for Proposal No. 50 – Lease of an optical scanning device to be used at Mississippi State University for test scoring, registration, faculty evaluation, and grade reporting.

Detailed proposal specifications may be obtained from the office of the State Central Data Processing Authority. The State Central Data Processing Authority reserves the right to reject any and all bids and proposals and to waive informalities.

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Executive Director

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Explosive Growth Predicted for Hospital DP Use

PALO ALTO, Calif. – An explosive annual growth rate in computer use of 80% is expected in the four major segments that make up the medical community over the next five years, according to a recent report from Creative Strategies Inc. (CSI) here.

The rapid growth expected in the areas of laborstory data systems, electrocardiograph analysis systems, automated patient history systems, and hospital communications systems will be the result of the past five years of development work, the report notes.

Of the four major market segments analyzed in the report, the laboratory data systems market is presently the most highly computerized, CSI said.

Presently this market segment includes installed systems with a value of $12 million at the end of 1970, CSI states. The value of such systems will explode to over $160 million by 1975, the study predicts.

The major factors that will push the use of automated laborstory systems, CSI notes, include a rapid growth in the demand for test analyses by medical personnel and a critical shortage of trained laboratory personnel.

The current leader in the market for laborstory systems is mini-maker Digital Equipment Corp., CSI said. Technicon and Coulter Electronics are considered dark horses with strong reputations, but IBM will probably jump into second place in the market by 1975, the report projects.

The use of computerized patient history systems is expected to grow rapidly over the next few years, the study shows, and will be valued at around $80 million per year by 1975.

The dominant suppliers in the field of electrocardiographic analysis are Marquette Electronics and Telemed Corp., CSI said, and there are no firms presently in a position to challenge that dominance.

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Tymshare Says Commercial Use Equals Scientific Applications

PALO ALTO, Calif. – There is a definite trend toward more commercial use of time-sharing systems, according to Thomas J. O'Rourke, president of Tymshare Inc. headquartered here.

O'Rourke indicated that "currently over half of our income at Tymshare ($10.3 million in fiscal 1970) comes from business or commercial applications. This, he noted, is a significant shift from as recently as two years ago when the mix was 75% scientific/engineering to 25% commercial.

The upsurge in commercial application "is particularly evident in the areas of forecasting, budgeting and budget analysis," O'Rourke declared, and among younger executives.

"The major market for time-sharing services is fast becoming the young middle manager who isn't intimidated" by computers "but rather is expanding his capabilities by using this new technique," O'Rourke added.

Success in the time-sharing business is dependent on effective software. "It requires," O'Rourke said, "at least one data base management package plus a formidable statistical package," he said.

Computer Entry Plans to Change Orientation From OEM to End User

SILVER SPRING, Md. – Computer Entry Systems Corp. (CES), the data collection hardware manufacturer, is changing its orientation from an OEM to an end-user company.

Its OEM stance was altered when Addressograph-Multigraph Corp. (AM) decided recently to give up its worldwide marketing rights to CES' Series 6000 data entry system. AM also relinquished its minority stock position in CES.

"AM is still a customer of ours," said Harvey J. Flatt, vice-president of marketing, "and it will continue to sell 200 of our systems, which it has purchased, in all areas except the Northeast."

CES will concentrate its new end-user efforts in that region, dubbing its lone product the Series 8000 while AM will continue to tag it the 6000.

Flatt is currently in the midst of hiring marketing people as CES gears up for its new orientation. "We're not precluding OEM in the future," he added.

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Packard Pushes Prototype Development, Sees Limitations on Defense Funding

CW Washington Bureau

WASHINGTON, D.C. – Computer companies looking to the Department of Defense to increase systems expenditures in the years ahead were not given much encouragement recently by Deputy Secretary of Defense David Packard, who also outlined changes in emphasis on development contracts.

Speaking at a briefing here sponsored by DoD and the National Security Industrial Association, Packard said there is "certain to be continuing pressure on the defense budget over the next few years and this will certainly tend to limit funds that we will have available for new defense systems and equipment."

There will be fewer dollars for defense weapons systems in the future, Packard said, because of manpower costs of the military services which have risen sharply "and will continue to rise."

The DoD official also reviewed the recently issued department directive (5000.1) which establishes policy for major defense system acquisition.

More Reliance on Hardware

"We want to keep programs in advanced development longer," Packard said. "We want to be sure we know what we're doing, and we want to put more reliance on hardware and less reliance on paper studies."

Major development contracts ahead will be cost-incentive types with performance milestones rather than calendar milestones, Packard said. "In many cases, if we go this route it will mean we will have to negotiate fixed-price production contracts on major programs after the development has proceeded far enough that we know what we're going to produce will work the way we want it to work."

During the current fiscal year, he said, DoD will establish modest goals on experimental prototypes, which are applicable for many areas of component and system development. "Experimental prototypes," he emphasized, "should not be confused with pre-production prototypes. Experimental prototypes will not necessarily be a part of the major engineering development."

Cuts Paper Waste, Too

Sales trainees undergoing three months of intensive instruction at RCA Computer Systems' Cherry Hill, N.J., facility receive typing instruction much like that given in secretarial school except a video data terminal is substituted for a typewriter. The video terminals are linked to an RCA 6. Once the salesmen-to-be have mastered the terminal, they are taught to program in a variety of languages.

African 370/155 Aids Efficiency Of Computicket

By Bohdan O. Szuprowicz
Special to Computerworld

JOHANNESBURG, South Africa – Although after the California State Parks debacle last year Computicket seemed to have been buried for good, it was revived here this month when Computicket (Pty) Limited formally came into operation as a subsidiary of Computer Science South Africa (CSSA).

"Computicket is finding its first effective application in South Africa," noted Perry Tucker, who controls two of the largest cinema chains in this country.

By using Computicket services, Tucker is able to computerize all the seats in his chains of theaters to exceed operating efficiency attained in the U.S. Sports events also will be included in the system.

South Africa has no television nor are movie houses open on Sundays. Therefore every weeknight theaters are packed to capacity and bookings must be made well in advance for the more popular films from England and the U.S.

Computicket will utilize a time-shared IBM 370/155 operated in Johannesburg by CSSA, which made its debut here early in 1970. The firm is 51% owned by Anglo-American, a holding organization and also the largest company in South Africa.

CSSA recently introduced its Infonet service here, and for this purpose brought the first Univac 1108 into South Africa. This prompted Univac to open a South African office and form a local marketing and service subsidiary.

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University Computing Co. will make a special distribution of a portion of its holding of common stock of Omega-Alpha Inc. to UCC shareholders. The shareholders will get one share of Omega-Alpha – often described as the "comeback" vehicle for former LTV president Jimmy Ling – for each seven shares of UCC held on Sept. 7. A little over 1 million shares of Omega-Alpha will be distributed. UCC is obligated to dispose of almost 2 million additional shares of Omega-Alpha by the end of 1972.

$$$

If it doesn't agree to go along with President Nixon's request for a freeze on dividends, United Utilities Inc. will increase its dividend to shareholders for the 12th consecutive year. The third quarter dividend of 24 cents per share is up 1 cent from the previous rate.

$$$

In its first year as a public corporation, Edwards Electro-Data Corp. reported earnings of $176,157 (20 cents per share) on sales of $3.4 million – a drop from earnings of $237,485 (32 cents per share) in its last year as a private firm.

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NN Corp., primarily engaged in the insurance business, reported that non-insurance operations in the computer industry were at the "breakeven" point at the end of the second quarter.

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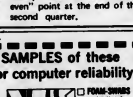

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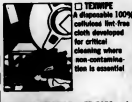

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Recent Rental Results Reflect Record Earnings, Some Timeshare Improvement

NEW YORK – Most leasing firms have effected a turnaround from last year's poor showings, it appears, as two new firms in the business join the seven others [CW, Aug. 18] that have reported increased earnings and revenues in 1971.

Both Leasco Corp. and Itel Corp. reported increased revenues and earnings for various periods that ended June 30.

Itel said revenues reached $58.8 million and income was $3.2 million (45 cents per share).

The results compare to revenues of $34 million and income of $889,000 (13 cents per share) for the first six months of 1970.

For the second quarter of 1971, Itel's revenues were $28.6 million, with income of $1 million (15 cents per share). For the corresponding period in 1970, revenues were $20.6 million and income was $768,000.

Leasco had record operating income for the third quarter ended June 30 of $7.6 million (47 cents per share) compared to $2.9 million (17 cents per share) a year ago. Total income for the third quarter of 1971 was $8.1 million (50 cents per share) compared to $1.1 million (7 cents per share) last year.

Revenues in the third quarter rose to a record $148.4 million, a 9% increase over last year's $136.8 million. Revenues from leasing, consulting and software, and time-sharing rose to $31.4 million from $29.8 million.

For the nine month period, operating income was $23.5 million ($1.48 per share) compared to $11.1 million (68 cents per share) during the first nine months last year.

Total net income for nine months was $26.5 million ($1.67 per share) compared to $8 million (50 cents per share) a year ago.

The time-sharing operation continues to make satisfactory progress although it is still sustaining a loss, according to Saul Steinberg, chairman.

Revenues Up, Income Down at DEC, 'Signs of Improvement' in Spring

MAYNARD, Mass. – Even though Digital Equipment Corp. reached record revenues in the past fiscal year, earnings declined sharply over the year earlier period.

At the same time sales and earnings were up in the fourth period over the results reported for the third period of the just completed fiscal year, DEC President Kenneth H. Olsen said.

Plans to announce a "family of large scale computation systems" plus a "major" addition to the PDP-11 family, were also revealed by Olsen in the year-end statement.

Sales for the year ended July 3 reached $146.8 million, with income of $10.6 million ($1.06 per share).

Sales and earnings for the preceding fiscal year amounted to $135.4 million and $14.4 million ($1.51 per share) respectively.

In comparison with the $42.5 million in sales and 28 cents per share registered in the fourth quarter, the company reported sales of $35.8 million and earnings of 23 cents per share in the third quarter.

During the year, the firm shipped over 1,000 PDP-11s, Olsen said, and over 1,500 PDP-8Es.

DEC recognized "the serious effect of the recession on our industry early in the year," Olsen claimed, but "decided to continue [its] product and market plans despite the sluggishness of the economy.

"Because of this strategy, we are going into the new year in a stronger financial, product and market position than in any previous year," Olsen added.

First Half Memorex Results Down, Quarter Losses Cut Considerably

SANTA CLARA, Calif. – Memorex Corp. registered losses for the second quarter and first half ended June 30, but the second quarter loss was cut sharply from the first quarter deficit.

For the first half, the firm lost $3.8 million (98 cents per share) on revenues of $51.5 million. In the same period a year earlier the firm earned $3.8 million ($1.02 per share) on revenues of $42.2 million.

The revenue figure excludes $33.5 million billed to ILC Peripherals Leasing Corp., a subsidiary. The revenues and related cost of its billing to ILC will be deferred and reflected on a prorata basis over the next 48 months.

ILC was organized in 1970 at Memorex's initiative to purchase a portion of the computer equipment marketed by Memorex for lease to computer users. Memorex's previous handling of the sale of equipment to ILC had come under fire from accountants [CW, Aug. 11].

The loss in the second quarter amounted to $1.5 million (39 cents per share), down from the loss of $2.3 million (59 cents per share) in the first period of 1971.

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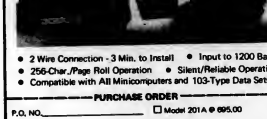

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EXCH		1971 RANGE (1)	CLOSE AUG 19 1971	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 4	1 1/8	0	0.0
A	APPLIED DATA RES.	5- 11	7 1/8	+1 5/8	+79.5
O	APPLIED LOGIC	1- 1	1/4	0	0.0
O	ARIES	1- 2	7/8	- 1/8	-12.5
N	AUTOMATIC DATA PROC	44- 65	60 7/8	+5	+8.9
O	AUTO SCIENCES	3- 8	3 1/8	-1	-22.8
O	BOOTHE DATA SYS	1- 2	1	0	0.9
O	BRANDON APPLIED SYS	1- 1	3/8	- 1/8	-75.0
O	COMPUTER ENVIRON	1- 2	1/4	0	0.0
O	COMPUTER NETWORK	2- 11	4 1/9	0	0.0
O	COMPUTER PROPERTY	5- 11	5 1/4	0	0.0
N	COMPUTER SCIENCES	8- 17	10 5/9	+1 1/4	+13.3
O	COMPUTER TASK GROUP	1- 3	1 1/4	+ 1/4	+16.6
O	COMPUTER USAGE	5- 16	7 1/4	+ 5/8	+8.7
O	COMP AUTOMOT REPORTS	6- 13	10 1/2	+1 1/7	+16.6
N	COMPUTING & SOFTWARE	27- 45	28 7/8	+ 1/8	+0.4
O	COMRESS	2- 4	2 3/8	+ 1/4	+11.7
O	COMSHARE I	4- 8	4	- 1/4	-5.8
O	CONSOL. ANAL. CENT.	1- 2	1	0	0.0
O	DATA AUTOMATION	1- 4	1 1/8	0	0.0
O	DATA PACKAGING	6- 10	8 3/8	+ 1/4	+2.9
O	DATAMATION SERVICE	1- 1	3/4	- 1/8	-14.2
L	DATATAB	4- 10	6 3/4	+ 1/4	+1.8
O	DIGITEK	1- 4	1 1/4	+ 1/8	+11.1
O	EDP RESOURCES	7- 18	9 1/4	+1 1/4	+14.7
A	ELECT COMP PROD	1- 7	1 1/2	+ 1/8	+12.0
N	ELECTRONIC DATA SYS.	33- 85	61 1/4	+4 1/8	+7.8
O	INFORMATICS	7- 15	10 1/7	+1 1/8	+12.0
A	ITEL	11- 23	11 1/4	+1 7/8	+15.7
O	KEANE ASSOCIATES	3- 14	6 1/2	+ 1/2	+8.3
O	KEYDATA CORP	8- 14	6	0	0.0
A	MANAGEMENT DATA	8- 11	8	+ 1/4	+3.7
O	NATIONAL CSS INC	7- 14	8	0	0.0
O	NAT COMP ANALYSTS	1- 4	1	0	0.0
O	NAT.COMP. SERV.	1- 4	7/8	0	0.0
N	PLANNING RESEARCH	16- 26	19 1/7	+1 1/4	+7.2
O	PROGRAMMING METHODS	18- 79	21 1/2	+1	+4.8
O	PROGRAMMING & SYS	2- 4	2 1/8	+ 1/8	+19.7
L	PROGRAMMING SCIENCES	1- 1	1/8	0	0.0
O	SCIENTIFIC COMPUTERS	2- 1	2 1/2	+ 1/4	+11.1
O	SCIENTIFIC RESOURCES	1- 2	1/8	0	0.0
O	SOFTWARE SYSTEMS	1- 1	2 1/2	+1	+88.6
O	TBS COMPUTER CENTERS	4- 9	4	0	0.0
O	TOLLEY INTL CORP	1- 8	8	+ 5/8	+8.4
O	UNITED DATA CENTER	2- 7	3 1/2	+ 1/8	+12.0
N	UNIVERSITY COMPUTING	21- 38	27 1/4	+1	+1.8
A	URS SYSTEMS	6- 11	8 7/8	+ 1/4	+3.7
O	U.S. TIME SHARING	1- 1	7/8	0	0.0
O	VORTEX CORP	2- 5	3 1/4	+ 7/8	+16.8

PERIPHERALS & SUBSYSTEMS

EXCH		1971 RANGE (1)	CLOSE AUG 19 1971	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	24- 48	38 1/4	+7 1/4	+6.2
O	ALPHANUMERIC	2- 8	2 3/8	+ 5/8	+31.2
N	AMPEX CORP	14- 25	15 3/4	+1	+6.7
O	ASTRODATA	1- 2	1 1/4	0	0.0
O	ATLANTIC TECHNOLOGY	1- 8	4 3/9	- 3/8	-7.5
A	BOLT,BERANEK & NEW	5- 8	4 7/8	0	0.0
N	BUNKER-RAMO	19- 17	19 1/4	+ 1/2	+5.1
A	CALCOMP	18- 33	20 1/2	+ 1/4	+1.7
O	COGNITRONICS	1- 9	3 1/4	+ 1/4	+8.3
O	COLORADO INSTRUMENTS	2- 8	2 1/6	+ 1/8	+3.5
O	COMPUTER COMMUN.	8- 19	8 1/4	+1	+11.7
A	COMPUTER EQUIPMENT	4- 7	4	- 1/8	-1.0
A	COMPUTEST	8- 20	9 1/8	+1	+17.3
O	CONSOL COMPUTER LTD.	5- 12	3 1/4	-2 1/4	-14.1
A	DATA PRODUCTS CORP	3- 10	3 1/4	+ 1/8	+2.2
O	DATA TECHNOLOGY	1- 9	5 1/4	+1	+23.3
O	DIGITRONICS	4- 8	4 3/8	- 1/8	-7.2
N	ELECTRONIC M & M	8- 18	11 1/8	+ 3/4	+7.0
O	FABRI-TEK	2- 4	2 3/4	+ 1/4	+10.0
O	FARRINGTON MFG	1- 1	1/4	0	0.0
O	FOTO-MEM INC	1- 6	1 1/4	0	0.0
O	INFOR K INC	25- 49	29 1/2	+5	+20.4
O	INFORMATION DISPLAYS	3- 8	3 1/4	+ 1/8	+7.6
O	MANAGEMENT ASSIST	1- 2	5/8	0	0.0
A	MARSHALL INDUSTRIES	14- 27	16 1/4	+1 1/2	+9.8
A	MILGO ELECTRONICS	13- 26	16 1/4	+1 1/4	+12.0
N	MOHAWK DATA SCI	72- 47	26 3/4	+7	+9.0
O	ON LINE SYSTEMS INC	7- 18	10	+1	+11.1
O	OPTICAL SCANNING	10- 18	11 7/8	+ 1/2	+4.3
O	PHOTON	7- 12	8	+ 1/8	+1.5
O	PHOTO-MAGNETIC SYS.	1- 8	2	- 1/4	-11.1
A	POTTER INSTRUMENT	13- 25	13 1/2	+ 1/4	+1.8
O	PRECISION INST.	7- 15	9 1/2	-1	-9.5
O	RECOGNITION EQUIP	17- 26	15 3/4	+1 3/6	+9.5
O	REDCOR CORP.	4- 9	4 1/4	-1	-19.0
N	SANDERS ASSOCIATES	11- 22	12 5/8	- 1/4	-1.9
O	SCAN DATA	8- 15	12 3/8	+2 1/4	+71.8
O	TALLY CORP.	8- 16	10 1/2	+1	+10.5
N	TELEX	11- 22	14 1/2	+1 1/4	+9.4
O	VIATRON	1- 4	7/8	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1971 RANGE (1)	CLOSE AUG 19 1971	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADAMS-MILLIS CORP	12- 18	11 7/8	+2	+16.8
O	BALTIMORE BUS FORMS	8- 10	7 1/2	0	0.0
A	BARRY WRIGHT	8- 13	7 5/8	- 1/8	-1.6
A	DATA DOCUMENTS	16- 29	18 3/4	+2	+11.9
O	DUPLEX PRODUCTS INC	8- 10	9 1/4	+ 1/4	+2.7
N	ENNIS BUS. FORMS	7- 11	7 3/8	- 3/8	-4.8
O	GRAHAM MAGNETICS	9- 13	23 1/4	+3 1/4	+16.2
O	GRAPHIC CONTROLS	6- 13	10 3/4	+1 1/8	+11.6
N	MEMOREX	27- 78	36	+3 3/4	+11.6
N	3M COMPANY	96-123	170 1/4	+3 1/4	+3.2
O	MOORE BUS. FORMS	16- 47	37 1/4	+1	+2.7
N	NASHUA CORP	29- 47	43	+3	+7.5
O	REYNOLDS & REYNOLD	37- 67	61	+6	+10.9
O	STANDARD REGISTER	18- 73	19	+1 1/6	+6.7
O	TAB PRODUCTS CO	8- 17	14 1/4	- 1/4	-1.7
N	UARCO	75- 14	26 1/8	-1 1/8	-5.0
A	WABASH MAGNETICS	6- 10	6 7/8	+ 1/4	+12.2
N	WALLACE BUS FORMS	18- 26	18 1/4	-2 5/8	-12.5

COMPUTER SYSTEMS

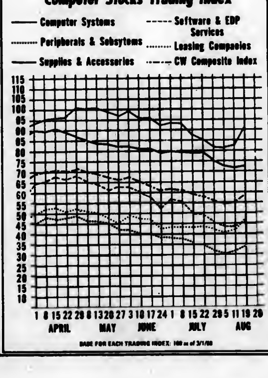
EXCH		1971 RANGE (1)	CLOSE AUG 19 1971	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	105-118	111 1/4	+10 5/8	+9.8
N	COLLINS RADIO	17- 70	12 1/4	- 1/8	-7.8
N	CONTROL DATA CORP	48- 83	60 1/2	+8 7/8	+17.1
O	DATA GENERAL CORP	19- 51	48 1/4	+2 1/4	+4.8
N	DIGITAL EQUIPMENT	51- 85	76 1/2	+4 3/4	+6.6
N	ELECTRONIC ASSOC.	3- 9	8 5/8	+ 1/9	+6.0
A	ELECTRONIC ENGINEER.	5- 9	8	+1 1/8	+16.3
N	FOXBORO	25- 46	45 5/8	+7 7/8	+70.9
O	GENERAL AUTOMATION	9- 26	11 1/4	+2 1/4	+26.1
N	GENERAL ELECTRIC	31-124	60 7/8	+5 1/9	+9.1
N	HEWLETT-PACKARD CO	30- 45	41 1/4	+7 1/2	+6.4
N	HONEYWELL INC	83-113	102 3/8	+5 3/8	+5.7
N	IBM	284-164	307	+15 1/4	+5.4
O	INTERDATA INC	8- 11	7 3/4	+ 5/8	+8.7
N	NCR	17- 49	41 1/2	+1 5/8	+9.5
N	RCA	26- 41	15 1/4	+4	+12.7
N	RAYTHEON CO	27- 46	18 1/8	+7 1/8	+5.9
O	SCI. CONTROL CORP.	1- 2	3/4	0	0.0
N	SPERRY RAND	25- 18	11 1/2	+4 1/4	+15.5
A	SYSTEMS ENG. LABS	8- 18	9 1/8	+1	+11.9
N	VARIAN ASSOCIATES	11- 18	14 3/8	+1 5/8	+12.3
N	VICTOR COMPTOMETER	14- 27	16 1/2	+1 1/2	+10.0
N	WANG LABS.	29- 50	48	+7 1/8	+18.3
N	XEROX CORP	83-119	118 1/2	+5 1/2	+4.9

LEASING COMPANIES

EXCH		1971 RANGE (1)	CLOSE AUG 19 1971	WEEK NET CHNGE	WEEK PCT CHNGE
A	BOOTHE COMPUTER	13- 27	18 1/4	+2 1/8	+12.7
O	BRESNAHAN COMP.	2- 4	3	+ 1/8	+4.3
O	COMPUTER EXCHANGE	3- 9	4 1/8	+ 3/4	+22.2
A	COMPUTER INVSTRS GRP	8- 14	9 3/4	- 1/4	-2.5
N	DATA PROC. F & G	11- 19	14 5/8	+2 1/2	+20.6
O	DATRONIC RENTAL	2- 4	2 1/8	- 1/8	-3.3
A	DCL INC (FORMERLY DIEBOLD COMP. LEAS.)	5- 11	8 1/4	+1	+12.1
A	DEARBORN-STORM	24- 44	39 1/4	+3 1/4	+9.9
A	DPA, INC.	4- 8	7 1/8	+ 1/7	+7.5
A	GRANITE MGT	7- 11	8 7/8	+ 1/4	+3.7
A	GREYHOUND COMPUTER	7- 11	9 1/4	+1 7/8	+75.4
N	LEASCO CORP	18- 24	24	+2 3/8	+12.2
O	LECTRO MGT INC	2- 5	2 1/8	- 1/8	-3.3
A	LEVIN-TOWNSEND CMP	5- 9	3 1/2	+ 1/2	+10.0
O	LMC DATA, INC.	1- 1	3/4	+ 1/8	+20.0
O	NCC INDUSTRIES	1- 8	7 1/8	+ 1/2	+7.5
O	SYSTEMS CAPITAL	3- 7	8 1/4	+1 1/2	+28.5
N	U.S. LEASING	16- 11	11 1/8	+7 7/8	+11.1

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Earnings Reports

DIEBOLD
Three Months Ended June 30

	1921	1970
Shr Ernd	$.58	a$.46
Revenue	38,853,223	33,699,285
Earnings	2,282,921	2,111,891
6 Mo Shr	.83	a.95
Revenue	$8,031,559	69,328,828
Earnings	3,922,410	4,396,873

a-Adjusted to reflect a 3% stock dividend in January 1821 and a three-for-two stock split in May 1871.

INTERDATA
Three Months Ended June 25

	1921	1920
aShr Ernd	$.06	$.02
Revenua	2,156,200	1,485,600
Earnings	102,400	32,500
a6 Mo Shr	.....	.04
Revenue	3,588,700	2,860,300
Earnings (Loss)	(111,100)	22,900

a-Based on the average number of common and common equivalent shares outstanding during the period.

INTERNATIONAL COMPUTER
11 Months Ended Feb. 28

	1921	a1870
Shr Ernd	b$.11	.....
Revenue	814,573	.....
Spec Cred	c191,797	.....
Earnings	a381,448	.....

a-Comparable figures not reported because of change in end of year from March 31 to Feb. 28. b-Based on income before special credit. c-From operating loss carryforward. e-Equal to 23 cents a share.

SCANTLIN ELECTRONICS
Six Months Ended June 30

	1971	1970
Revenue	$3,421,258	$4,854,858
Loss	2,188,483	246,498

TELECREDIT
Year Ended April 30

	1871	1970
Shr Ernd	a$.10	.....
Revenue	2,748,327	$2,923,346
Tax Cred	66,000	.....
Earnings (Loss)	b149,948	(1,467,831)

a-Based on income before tax credit. b-Equal to 17 cents a share.

ELECTRONIC ASSOCIATES
Three Months Ended July 2

	1971	a1870
Shr Ernd	$.01	.....
Revenue	7,351,000	$8,591,000
Earnings (Loss)	20,000	(2,328,000)
6 Mo Shr	.07	.....
Revenue	12,877,000	14,669,000
Earnings (Loss)	184,000	(3,395,000)

a-Restated.

BRADFORD COMPUTER & SYS.
Three Months Ended June 30

	1971	a1970
Shr Ernd	b$.13	$.09
Revenue	3,321,413	2,346,151
Tax Cred	c34,800	.....
Earnings	e444,631	265,792
6 Mo Shr	b.26	.18
Revenue	6,609,012	4,602,941
Tax Cred	c45,400	.....
Earnings	e847,439	563,335

a-Restated to include Bradford Mutual Fund Services, acquired May 1871, on a pooling-of-interests basis. b-Based on income before tax credit. c-From tax loss carryforward credit of Bradford Mutual Fund Services Inc. e-Equal to 14 cents a share in the quarter and 27 cents a share in the six months.

PROGRAMMING & SYSTEMS
Year Ended Feb. 28

	1971	1970
Shr Ernd	a$.10	$.13
Revenue	5,122,908	5,355,898
Spec Cred	b230,187	.....
Earnings	c495,084	416,439

a-Based on income before special credit. b-From loss carryforward. c-Equal to 15 cents a share.

DATA PROCESS FIN & GEN'L
Year Ended May 31

	1971	1970
aShr Ernd	$1.48	$.64
Revenue	49,853,000	49,387,000
Spec Chg	b448,000	e6,638,000
Earnings (Loss)	c5,515,000	(4,256,000)

a—Based on income before special charges. b—Consists of a writeoff of company's investment in Berkeley Computer Corp., offset by gains on sale of Applied Computer Time Share Inc. and recovery on settlement of law suit against IBM. c—Equal to $1.37 a share. e—Consists of write-down of certain second generation computer equipment, provision for liquidation of discontinued operations, writeoff of certain investments and sale of aircraft.

PRECISION INSTRUMENT
Six Months Ended March 31

	1971	1970
Revenue	$2,436,000	$2,462,000
Loss	385,000	933,000

The canister melted; the flanges buckled. The tape came through.

It's Epoch 4.

This was no white-coat lab test—it was a genuine, hook-and-ladder, water-hoses-everywhere-type fire.

When things cooled down, the Graham Magnetics labs found four reels of Epoch 4, with the canisters melted together, and the flanges all heat distorted. The flanges were removed, and the tapes were played on CDC certifiers at a 45% clipping level, at 800 bpi.

Here's how Epoch 4 came through:

Tape #1: no permanent errors; no temporary errors.

Tape #2: one permanent error; three temporary errors.

Tape #3: no permanent errors; one temporary error.

Tape #4: four permanent errors; three temporary errors.

So maybe you don't plan on having a fire.

Nobody does. But even if your tapes never get hotter than a frozen daiquiri, you'll be safer with Epoch 4. Here's why:

Epoch 4 came through the fire because of its physical toughness. The tape withstood the tremendous pressures generated by rapid expansion and contraction, as well as the direct heat.

This same physical toughness is what makes Epoch 4 last so much longer than conventional tapes in normal usage. Because Epoch 4 is 8000% tougher than competitive tapes, it shrugs off the careless handling that causes most damage to computer tape. And because of this toughness, Epoch 4 withstands the stresses imposed by long-term shelf storage.

In fact, Epoch 4 is so tough, we guarantee it for twenty years.

Think it over. Maybe you'll never have a fire. But handling damage and storage stresses will always be around.

Your data deserves the extra protection of the toughest tape in the business.

Your data deserves Epoch 4.

GRAHAM MAGNETICS

GRAHAM, TEXAS 76046